• COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper – Second-class postage paid at Chicago, Illinois

Vol. IV No. 48 | December 2, 1970 | Price: $9/year

Police Say Mafia's DP Use Impedes Crime Prevention

By P.L. Carney
Special to Computerworld

"I doubt," said a police systems analyst, "that somewhere there's a DP center with a sign on the door saying, 'only authorized Mafia personnel allowed.' There doesn't have to be."

That policeman was referring to the use of data processing by organized crime in the U.S. He is one of the growing number of police officials who believe that the Mafia – also called the syndicate, "organized crime," La Cosa Nostra – uses data processing in its activities to increase the efficiency of its operations.

The information possessed by organized crime in the U.S. and in its operations around the world has to be staggering.

It probably ranges through a variety of subjects from profiles on its own membership, through inventories of contraband materials, to an accounting of its wealth, which, the U.S. Government says, reaches billions of dollars every year.

Variety of Subjects

"Computers," said an Illinois police DP expert, "would be the best place [for the Mafia] to store that kind of volatile information because while it is in a

system it is in a non-legible medium."

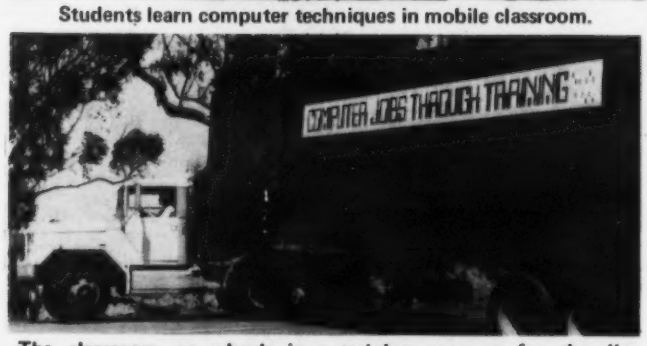
Whether or not the Mafia owns computers outright does not seem to be a major concern to law officers. "We know," a New York state official said, "that we're not going to break down a door somewhere and find their center.

"Even if we could, or did, there wouldn't be a neat set of tapes or decks to run and obtain the whole picture of crime in the state in a concise printout and set of data books. We, they and us, fight a different kind of war."

But there is police concern over the fact that the Mafia does use computer systems. EDP, the police say, gives an

(Continued on Page 2)

Students learn computer techniques in mobile classroom.



The classroom on wheels is a training program for the disadvantaged.

DP on Wheels

Class Finds Students

HOUSTON – Since early spring, a trailer truck has rumbled the San Diego streets with a cargo of a modern well-equipped classroom and an IBM computer. On the outside, foot-high letters spell out "Computer Jobs Through Training."

Addressing an FJCC session, Dr. M. Granger Morgan, director of Computer Jobs Through Training (CJTT), said: "Operating from the San Diego campus of the University of California, CJTT's mobile classroom makes it possible to take the training facilities directly into the student's own community and, consequently, makes the computer equipment accessible to many students throughout the city.

"During the past two years, more than five introductory programming classes have been run for disadvantaged San Diego area junior and senior high school students.

"Computer programming appears to be a natural direction for improving the career choices of low-income and minority youth," Morgan said.

On the Inside

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Council Bars Punched Card Vote, Orders Detroit to Sue Vendor

By Thomas J. Morton
CW Midwest Bureau

DETROIT – The Common Council has voted to "dump" punched card elections after two trouble-filled elections, and has ordered the city's attornies to bring suit in the amount of $1 million against Datamedia Computer Services, Inc., the Dallas-based firm that brought punched card voting to the Motor City.

In a prepared statement, Datamedia President Thomas Shoen said: "My machines functioned well, my people were superb, our educational programs were the best the industry had to offer. That wasn't the problem election night."

Shoen also said he feels that an agreement still can be worked out without going to court.

The suit for damages, it is reported, would stop the transfer of city funds to Datamedia for services rendered. Detroit owed approximately $100,000 to Datamedia.

Also, the Common Council ordered taking the repurchase option on the old lever type voting machines purchased from Detroit at the time of the August primary.

The original contract between Datamedia and Detroit would have prohibited such resale of the machines to the city after Sept. 1, but the deadline was extended to Dec. 1 after the primary.

'Hard Time' Ahead?

While sentiment in the city runs high against the use of punched cards and Votomatic machines, the feeling here is that the city will have a hard time winning its damage suit in court.

"The workers at the counting centers," one source said, "had too much to do with the general foul-up to let the city win on the presumption of everything being the fault of the system or the programming . . . . or even the fault of the Votomatic machine."

Meanwhile in Michigan's Genesee County and the city of Flint, officials expressed confidence in the system used there although delays caused the final tally to be held up until Wednesday morning.

W.R. Penberthy, data processing administrator for Flint, denied reports [CW, Nov. 11] that humidity and rain hindered the swift completion of the counting of the general election punched card ballots for the Genesee County vote as a whole and declared that no force drying of wet or damp cards as previously reported was employed.

He attributes the delay in the count results of Genesee County to malfunction of an IBM card reader which, he said, two IBM customer engineers attempted to adjust "all night and the next day with limited success."

Flint's count program was run at the Drain Commission DP center in the city and, according to Penberthy and other sources, ran without incident.

Penberthy maintains that, since the Drain Commission program run, with identical configurations, was successful, the cause of the intermediate school county run was that of hardware malfunction and not swollen cards.

Bill D. White, DP manager at the office of Genesee County Intermediate School, told CW however, that in his opinion, the problems were caused by the humidity.

"We ran," he said, "both the test deck and the [count] program object deck through our 2540 card reader without any problems. It was only when we ran the ballots that we had any [problems]."

He explained that the object and test desks had not been exposed to the elements as had the ballot punched cards.

A Friend at the IRS?

WASHINGTON, D.C. – If you make under $20,000 this year, you could have a friend at the Internal Revenue Service.

The IRS will be putting the computers in its seven regional centers to work to compute the tax of any taxpayer who requests it. There are two major requirements: you must earn under $20,000 and take only the standard deductions on the 1040 form.

The $20,000 limit is a quadruple jump for IRS, which heretofore only computed the tax for individuals with incomes under $5,000.

The IRS estimates that it will do the arithmetic for nearly 30 million taxpayers in 1970. The aim, the service said, is to reduce the errors that officials found on 3.6 million of the 78 million returns filed for 1969 income.

IRS has a verification program wherein the computer verifies the tax computed by the taxpayer.

A spokesman for IRS said that conceivably the figure handled could go higher, but that $20,000 "takes care of quite a chunk of the population." There are no plans to increase the figure, he added.

The program that computes the tax is called the "posting and analysis run." Items from the taxpayer's return are posted to tape and the tax is computed. The computer also analyzes whether the taxpayer owes IRS additional money or whether a refund is due.

Mafia's Use of Computers Serious Concern to Police

(Continued from Page 1)

efficiency of operation, an ability for thoroughness of planning that the police feel definitely sets back their efforts to stop the operations of organized crime.

Admittedly, the police of this country, including federal agencies, say they are fighting a war which organized cime has declared and they are aware, they say, that knowledge of the enemy is an asset.

But what of the Mafia?

Does it have knowledge of the "enemy," the policeman?

Police officials around the country are convinced the Mafia has exactly that type of knowledge.

"We would have to find a 'bad cop,'" said a California policeman, "while they'd be working with him."

Inclusive List

While a Justice Department representative said he felt the Mafia could possess a list of every policeman in the country, a Southern police official preferred to say that the Mafia list, while national in scope, listed only police commanders, "probably," he said, "down to sergeant, if the sergeant commanded a field tactical unit."

"Certainly," said a crime commission investigator, "the strategic planning of any long-term criminal operation would necessarily include information on police effectiveness in the chosen geographical areas as well as on the police units that would be assigned to investigations within the framework of the particular crime or crimes," he added.

While police officials admit that no one has seen the list, most do admit of its existence, though some do add the adjective "probable."

"Information on police is," an Illinois detective said, "definitely a factor in their thinking.

'Total' Policeman

"While they may not care how well a 'white hat' (traffic or accident investigation officer) does his specific job, they would be concerned with his way of being a 'total' policeman. A lot of crime has gotten off to a bad start because some 'white hat' noticed a gathering of known criminals and had the smarts to phone it in."

To be effective, policemen say, the list would have to be current, reflecting such things as duty transfers, furloughs, assignment changes, and the like. That, they maintain, would demand constant upgrading.

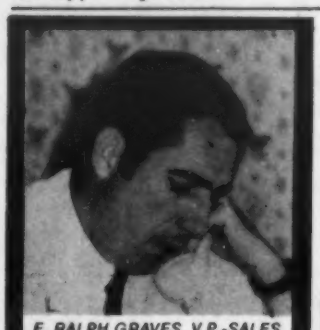
"Which would present no major problem at all," said the police systems analyst. "A numerics program could be sent to and run in any center that was equipped with disk and that was on-line."

He added that a T/S firm could be doing a Mafia program without even knowing it.

"The time-share operator," he said, "can protect himself by simply following the standard business practice of knowing his customers thoroughly. He can also be a little wary of the customer, whom he doesn't know too well, who wants back-up for storage somewhere off the time-share installation.

"Remember, too," he said, "that the time-share operation is not the only place the Mafia could run a disk program. It could well be done in the DP center of the most reputable business in town. Lots of centers have lots of time on the machines that never gets put into the console logs.

"I would recommend to any DP manager that he institute tight controls on his machines and on his people. Discipline has yet to hurt a good DP operation."



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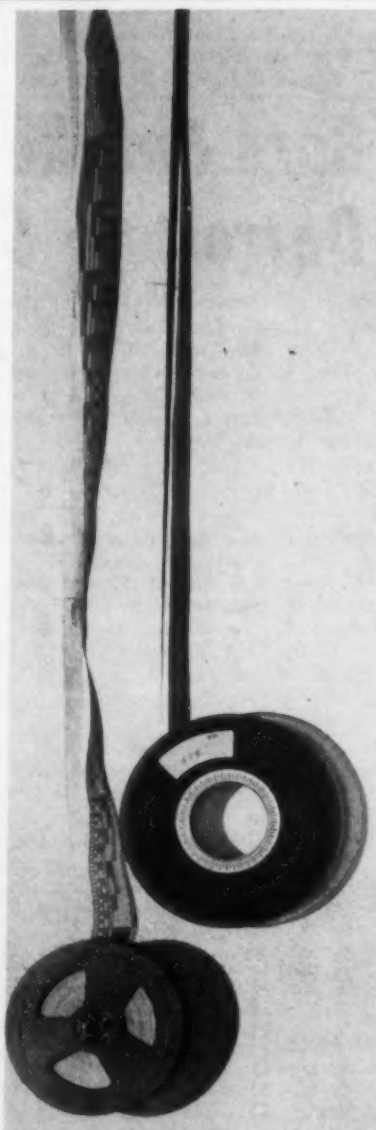

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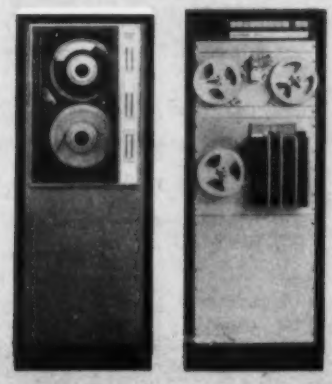

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Application Has a Lot of Heart

By Edward J. Bride
CW Staff Writer

BOSTON – A computer system which "reminds" operators when action is due, and which "flags" disputed accounts, is being heralded by the electric company as "a computer with a heart."

The Customer Inquiry System (CIS) was devised by Boston Edison Co. two years ago, but a publicity campaign has turned this "old" application into a good public image for the large utility, which serves an estimated 1.5 million people in the Boston area.

The "heart" is really 48 people, who operate CRT terminals equipped to display a customer's account, billing history, trouble call record, or any one of 17 other desired charts.

Net result of the inquiry system, according to a BE spokesman, has been better service to the customer, without any loss of jobs or increase in rates.

The benefits are being used to counter bad public relations incurred during the current anti-pollution campaign and an "anticipated" rate increase when the company is forced to use low-sulphur fuel.

CIS actually went into use in November 1968, and a brief advertising campaign was implemented then to explain to customers why company employees were able to give such quick response to inquiries.

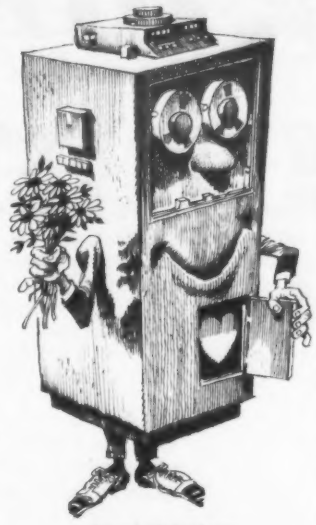
Boston Edison serves 500,000 residences in the 40 cities and towns around New England's largest city. Using two IBM 360/40s acquired in 1965, plus 48 Model 2260 terminals, the company has automated its billing procedures, as well as customer inquiries.

Operators enter all new-service requests, and termination requests, and the computer "reminds" them if no action has been entered when 10 days have elapsed.

The operators can also "flag" the accounts of customers who dispute a bill, pay late, issue a bad check, or request a test of a meter.

John McColgan, assistant superintendent of the Procedures Department, of which data processing is a division, said that billing disputes are the most common consumer problem, but that the inability to read the meter is usually the cause.

The company will now estimate a customer's power consumption only twice, then notify the customer of the difficulty. A high estimate, or the correction of a low estimate, is normally the cause of such a dispute, reported McColgan.



Peace Offerings

Other utilities have adopted a similar system, McColgan stated, and scores have shown an interest in implementing CIS in the near future. He estimated that a hundred different utility companies had corresponded with Boston Edison on this matter, and half had implemented such a system.

Official Action Ruled Out By ACM in Squire Case

HOUSTON – Intervention in a black programmer's bombing conspiracy trial would be "outside [the] constitutional purposes" of the Association for Computing Machinery, the ACM Council has decided.

The Council urged ACM members "as individuals" to "familiarize themselves with the facts" in the case of Clark Squire, one of 21 Black Panthers arrested in April 1969, before the alleged conspiracy could materialize.

In other issues at the council meeting, which followed the Fall Joint Computer Conference here, the council directed the committee planning next summer's ACM conference to break precedent by generating a "surplus" of $5,000, and to do it by charging a maximum $35 entry fee for members. At ACM '70, members paid up to $60.

The council also adopted a "provisional" measure allowing for cost-free public admission to exhibits only at ACM '71, which will be held in Chicago Aug. 3-5. Last September at ACM '70, the public was charged $2, and only 2,000 showed up, out of a hoped-for 10,000.

In other business, the council put off until the next meeting a request by the Special Interest "Committee" on Computers and Society (SicCas) to be granted the more permanent status of "group."

SicCas was formed earlier this year, after a committee on the Social Implications of Computers was permitted to "expire." The council indicated that the delay was caused by a technicality, and that "SigCas" would probably be approved at the spring meeting of the council.

News Wrapup

Ervin's Privacy Bill Seen Dying

CW Washington Bureau

WASHINGTON, D.C. – The House is not expected to take any action on Sen. Sam Ervin's (D.-N.C.) bill to protect the privacy of civilian employees in the executive branch of government. The Senate passed the bill unanimously.

A member of the House Subcommittee on Manpower and Civil Service said the lower body's bill is "languishing." And "no action" is expected to be taken on it in this "lame-duck" session of Congress. He added that the group has been tied up on a federal blue-collar employee pay raise bill.

Originally, the House had been expected to act on the bill last July.

An aide on Ervin's Senate Subcommittee on Constitutional Rights said that Ervin will reintroduce the bill without changes in the next session.

Personal information, under the bill, would be kept out of government computers.

House Endorses National Job Bank Plan

WASHINGTON, D.C. – The House of Representatives has taken special notice of the need to "enlist the computer to help the nation solve its employment problems."

As part of H.R. 19519, "The Comprehensive Manpower Act," passed by the House recently, Part B of Title IV of the bill deals with a national computerized job bank program.

In the House bill, the secretary of labor was formally authorized to develop and establish a bank for the purpose of identifying manpower and job vacancies, for matching qualifications for referral and placement, and for "distributing and assuring the prompt and ready availability of information."

Committee Wants Limited DP Assistance

ST. PAUL, Minn. – A special reapportionment committee assigned to remap congressional and legislative districts for the vote approval of the 1971 Minnesota legislature appears to be very reluctant to let computers help it do the work more efficiently.

Several committee members have been quoted as saying that they feel a reapportionment job is historically "an intensely political" one and that it should remain so in 1971. They are said to oppose using computers to draw up district lines.

Payroll May Be Problem for GM DP Managers

DETROIT – With the United Auto Worker strike against General Motors Corp. over and production in gear again, GM DP managers report that the strike didn't have too great an impact, but now that it's over, it will cause some programming problems once all the pay factors are finalized.

Suit Brought Against Computer Dating Unit

MINNEAPOLIS, Minn. – A computer-dating firm was recently accused by the attorney general of using fraudulent advertising to bilk the public in a scheme to "guarantee compatible companions."

Attorney General Douglas Head filed a civil fraud suit against Compatibility Services, Inc., a California corporation with offices here.

The suit, filed in Hennepin County District Court, alleges that the dating bureau induced the public to pay amounts up to $495 to enroll in the firm's program, which, Head claimed, promised them that they would be "matched" with compatible dates.

Computer Outpaces Announcer's Elocution

CHICAGO – Giving a computerized analysis of traffic conditions has helped the motorized commuter here, with one slight problem. The announcer talked too fast.

Last September, WBBM, the CBS radio outlet in Chicago, began a traffic report show utilizing a Honeywell 1648. The idea behind the show was to tell Chicago's drivers what the traffic conditions were, suggest alternate routes, and give accurate times a motorist would be "enroute," including delay time, from one point on Chicago's complex of tollways and expressways to another [CW, Sept. 16].

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Second-class postage paid at Chicago, Ill. Published weekly (except: a single combined issue for the last week in December and first week in January) by Computerworld, Inc., 25 E. Chestnut St., Chicago, Ill. 60611. © 1970 by Computerworld, Inc.

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Students, Teachers to Benefit From High School T/S

RALEIGH, N.C. – A nonprofit time-sharing system owned exclusively by high schools was dedicated here last week.

The corporation, School Computer Service Corp., will train and serve about 2,000 student and 100 teacher users during the academic year, and member districts will actually own their computer within three years, officials stated.

The GE 265 being leased by the bureau is the same configuration as that used by the original Dartmouth T/S operation, and currently has terminals in 27 different high schools in 10 school districts across the state.

The system will operate around the clock seven days a week.

The terminals are connected by telephone lines to the main computer facility, at the Occidental Life Insurance building here. The computer will be operated and serviced by Independent Data Processing Corp. (IDP), a subsidiary of Occidental and a progenitor of Call-A-Computer, a commercial time-sharing service.

The corporation was formed in Raleigh by school districts and IDP, which installed the terminals and which foresees a second system within a few years.

IDP President Clint DeGabrielle, formerly with GE and then with Call-A-Computer, said he was "not ambitious for nationwide" expansion of this particular system, but could easily foresee the idea growing throughout the Southeast.

Noting that Dartmouth had upgraded to a GE 635, then doubled that configuration this year, DeGabrielle said IDP was "looking at a lot of hardware" for the projected expansion of School Computer.

He indicated he would like to have a multilanguage capability. with a minimum of 40 simultaneous users on the system. The 265 permits a maximum of 40 simultaneous terminals, and represented "the most computing power for the money spent" in establishing this first system, he stated.

With 27 schools already on the system, there is room for some expansion, before acquisition of a second computer is necessary, he added.

Each school district will be paying an identical $15,000 per year for computer time and service, until the system is owned after three years. Each district will have six to 12 terminals, depending on the number of schools and other requirements.

DeGabrielle also said there was no federal funding of the project.

The new corporation aims primarily to provide computer use as a student tool; to eliminate time-consuming manual processes whose principles and relationships the students already understand; to help them learn to think logically; and to stimulate maximum achievement, most of all perhaps for those who are either gifted or slow.

Applications to Vary

Specific applications will vary from school to school. In the four years since Raleigh's Needham Broughton High School began renting time-sharing computer services, schools in a dozen North Carolina cities have acquired time-sharing experience involving more than 2,000 students and 100 teachers.

Time-sharing has been used in mathematics, science, economics, art, music, and accounting.

Students use Basic Language and then write their own programs to compose music, simulate chemistry experiments, score sporting events, develop dating compatibility, write poetry, calculate geometric areas, play baseball, and calculate trajectory of a space vehicle. One student even worked out a "perpetual space-time calendar" for the planets of the sun.

Faculty Use

In addition to the student use, teachers and administrators have used the computer to schedule classes, prepare budgets, plan menus, develop grades, conduct statistical analysis, and serve as a tool for remedial assistance.

The time-sharing computer has had enthusiastic response from students, faculty and parents, in every case. Students have given up lunch time and stayed after school to work on terminals. Several students have used the knowledge to gain jobs during the summer.

Programmers, Analysts May Form Computer Union

NEW YORK – Reacting to the waves of layoffs in the industry, a group of programmers and analysts are attempting to form a programmers union.

The Committee to Form a Computer Union, currently based here, is planning to hold an organizational meeting in the Social Service Union Hall Thursday of this week at 6:30 p.m.

A spokesman for the organizers said that due to the deteriorating employment situation in the last six months, "more and more individuals are becoming interested in the benefits of collective action."

The three basic goals for computer people are protection from uncontrolled layoffs and indiscriminate firings, the opportunity for computer employees to be trained for other positions within the field, and a voice in deciding the type of work they do, as well as the conditions under which they work, according to the committee.

Presently composed of operators, programmers, employment agents, keypunch operators, and systems analysts, the committee intends to work for all employees in the data processing field.

The development of a computer union bear similarities to recent organization attempts within other professional and technological occupations, a spokesman said.

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Editorial

Better Late Than Never

Recently a federal judge in San Francisco refused to dismiss a $3.20 suit brought by a 71-year-old man over a Medicare bill.

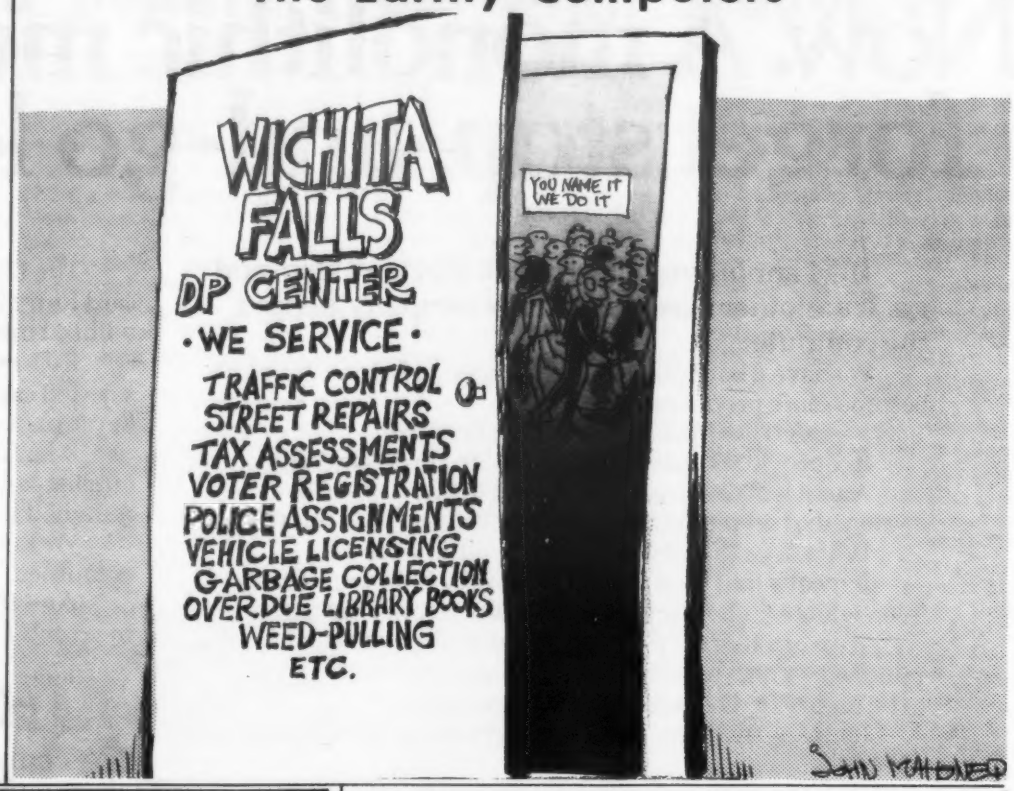
Said Chief U.S. District Court Judge Oliver J. Carter: "I feel what's happened here is that we are losing the battle to the computers. The loss of individual rights to the tune of $3.20 doesn't mean anything anymore."

But even as the public attitude toward faulty computerized billing was hardening even further, Boston Edison ran a large advertisement in a Boston newspaper under the headline, "A computer with a heart?"

"Whenever you have a question about your bill," the ad said, "we can check it out electronically in seconds."

If Boston Edison lives up to this promise, and if other large companies will follow suit, we can quickly restore confidence in computerized billing – and in the computer.

The Earthy Computers



Letters to the Editor

Cost-Conscious Acts Lauded

Three cheers for Frank Majdali for standing up to the Washington State Highway Division and to general waste of tax funds through inefficient use of computer resources. A thousand baud to 10 million nsec he's right, even though he may never have the opportunity to prove his charges.

It would be an outstanding service to the taxpayers of this country if "gadfly" Majdali became the Ralph Nader of the "bit set" to reveal how today's bloated $10 billion EDP industry – that should be a $5 billion EDP industry – will in the next decade become a bloated $25 billion industry – that should be a $9 billion industry.

That would be a jolting "byte" by any gadfly.

John A. Guin
Business DP Education

Riverside City College
Riverside, Calif.

Why Not Count Ballots by OCR?

The Nov. 11, Nov. 18 issues contained considerable comment about the failure of computers in counting election results. I would like to ask a question: what is wrong with paper ballots if a means can be found to read them? Factually, a means has been available to read marks on paper for well over 30 years.

In the early days of mark reading, it was necessary to use a special pencil that placed a deposit on the paper that would conduct electricity. Today, marks can be read optically.

Therefore, I would suggest that we go back to paper ballots. With a little effort, they could be made smaller than the old fashioned ballot. The marks would be read by OCR equipment and the votes tallied.

I can see two decided advantages.

- As each precinct was counted, one of the contests could be counted manually, to validate the accuracy of the machine count. On each successive precinct, a different contest would be counted, manually.
- If it was necessary to make a recount, the count could be either by machine or manual as the conditions seemed to indicate.

Finally, I see no reason why the start of the count need be delayed until the polls are closed. I have counted paper ballots and know the procedure.

To speed the count on an optical reader, the ballots could be removed to a container, periodically, when the ballot box counter stood at even hundreds. The container would be sealed and removed to the counting location by the police, sheriff's officers, or other proper authority. Obviously, no figures would be released until the polls were closed and total counts, by precinct, verified against the ballot box figure.

I think this approach should be looked into.

Theodore C. Morrill, CDP
Electronics Chief Engineer

Liberty Mutual
Boston, Mass.

Licensing Implications Predicted

Great! If Sen. Alfred Song's hearings result in licensing guidelines for programmers and operators, the computer industry should benefit from such standardization as much as have our up-to-date school systems, medical associations, etc.

Massive numbers of programmers, all duly licensed, could be assembled to perform so much pre-check and post-check of work that it will become almost impossible to get anything done at all, and then we'll have perfection.

Come to think of it, why not licensing for senators? I think perfection in government would be swell too.

Gary Berlind

Data-Tech Corp.
Los Angeles, Calif.

Name's Not Quite the Same

Alan Drattell's Nov. 11 column reviewed a system developed by the Center for Political Research which keeps track of what's happening in the government. He mentioned that "software" for the project was done by "Mathematics" of Princeton, N.J.

For the record, the name of the company is Mathematica, a privately owned consulting company headquartered in Princeton with offices in Bethesda, Md., Washington D.C., Milan, and Paris.

The "software" actually was Ramis (Rapid Access Management Information System). This system has been available for over three years now in both a T/S and batch version and is gaining broad acceptance and diversified application.

Stephen J. Jurnack
Manager – Systems Marketing

Mathematica
Princeton, N.J.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.

Highway Bureau Seeking Safety Information Net

WASHINGTON, D.C. – Westinghouse Electric Corp. is expected to submit a final design report within a few weeks to the Department of Transportation's National Highway Safety Bureau (NHSB).

D.C. Data-Line
By
Alan Drattell

The report is a major step in the development and implementation of an information network design to provide the NHSB and the states with needed safety data.

The specific aim of the system is the identification and reduction of accident causes and the severity of injuries that occur on the nation's highways.

The preliminary design of the system was described by Langston A. Spell, chief, Information Systems Branch Research Institute with the NHSB, at a seminar held here on the NHSB activities in traffic records and data systems.

The seminar was sponsored by the Safety Management Institute, a division of Tracor Computing Corp., in cooperation with the NHSB.

Major participants in the system, according to Spell, are the states, the bureau and research associations. The states will participate at two levels – a fundamental level for all states (called Basic Level States) and an enlarged level for selected states (called Prototype States).

Basic states already have accident reporting, drive files and vehicle files "and such files as their vehicle inspection and highways," Spell added.

Prototype states have many additional features; e.g., "they make data available in their operational files in a coordinated and improved form. They take data from their driver, vehicle and highway files, combine it with data from their accident reports, and create special files for the system."

Spell explained that the system provides for translating "user needs . . . into action. This can be done at two levels: the simpler provision of data and services with computational support; and the leadership and coordination which will be applied to developing and administering system standards and controlling the total system development."

The approach has been to "exclude a fixed, static design; instead, we have sought an evolutionary design for a continually developing system."

In the beginning, a number of small systems and activities will constitute the building blocks for the eventual system. By 1973, these blocks will be combined into a more cohesive, interactive structure serving many more functions; and by 1976, expansion of the 1973 version will have taken place.

As designed at present, the system has four main characteristics, according to Spell:

- It is comprehensive in that "it encompasses a broad spectrum of interests within the safety community."
- It is compatible in that "it makes the safety data and findings of one user available to others."
- It is responsive since "it is designed to be able to adapt to new needs and new kinds of data requirements."
- It is built on an existing foundation. "It is based on existing data sources, files, hardware, software, people, organizations and activities."

Spell added emphatically that the system will have protective controls to ensure privacy.

Independent Critique on Amigos, Isam 'Replacement'

Last week I commented that the real essence behind the $64 Isam Question was the emergence of something called Amigos, an apparent replacement for Isam.

Amigos, however, is a new system, which has test data, but no long-term history behind it. It impressed me, but then I did not sit down and go in detail through its manuals, and I could not help noticing that while the organization often happens weekly or even daily on files, an advantage obtained in this area might well be masked out by some disadvantages in other areas.

The Taylor Report
By
Alan Taylor, CDP

In looking for such disadvantages I did not find them. In fact I became quite a convert to Amigos, so much so that I thought you might be interested not so much in my opinion, but in what other independent observers feel.

Because it is so new there is only one source of an independent critique that I could find, and this was Datapro Research. It covered Amigos in its November issue and seemed to be as favorably impressed as I have been.

Here then, is part of what the experts of Datapro Research said about Amigos in a copyrighted report.

Amigos may herald a new era in proprietary software. To coin a phrase, Amigos may be called "plug compatible" software by analogy with the host of magnetic tape and disk drives marketed as replacements for IBM units. Amigos replaces a standard piece of IBM systems software, Isam (Indexed Sequential Access Method).

Actually, "replace" is a misnomer. Amigos fits into the IBM operating systems through the standard provision for user-coded I/O routines, a logical replacement rather than a physical replacement.

In fact, Isam and Amigos can coexist – an advantage when programs and files are being converted.

Amigos claims to offer substantial advantages in amount of main memory used, speed of accessing data, and efficiency of disk utilization. Many features have been incorporated into the package to accomplish these aims. Versions for both OS and DOS are being marketed.

Features' Significance

The upshot of these features can be summarized as follows:

- OS users will get substantial savings in core and disk utilization, as well as potentially large performance gains.
- DOS users will benefit primarily in performance gains, as well as in disk utilization. (Some smaller DOS installations of Amigos may show little gains in any area except file reorganization.)
- Users having applications with a large volume of record additions, the requirement for both basic (random) and queued (sequential) accesses, and the need to perform a large volume of random accesses will benefit the most.
- Applications using disks for sequential update processing (essentially as a logical replacement for tape drives) will probably show little gain in performance.
- Programs must be modified and reassembled or recompiled, and the disk files must be reloaded to use Amigos.

Isam is being heavily promoted by IBM. Yet, some users are selecting another access method, writing their own I/O control, or electing not to implement certain applications because of the space and/or time required by Isam.

A couple of results from Comress' demonstration runs illustrate why the company is being so lyrical in its promises to users.

One job that took 28 hours to run using Isam was cut to 3 hours with Amigos. The response time in one inquiry system was cut from 3 minutes to 6 seconds.

These figures represent situations that could take advantage of most of the features of Amigos. It is difficult to estimate the savings for specific installations, but the outline above will serve as a guideline.

Amigos was developed by Data Art Corp., which was funded in part by Comress. The package is marketed and supported by the various Comress offices throughout the U.S.

Characteristics

Supplier: Comress, Inc., Two Research Court, Rockville, Md. 20850.

Basic Function: To replace the IBM Indexed Sequential Access Method (Isam) modules on any System/360 computer system operating under DOS or OS. Amigos features reduced core requirements, higher performance, and better disk space utilization.

Operation: Amigos fits into the IBM operating systems as a user-coded I/O routine; installation requires adding Amigos to the systems library, converting all Isam data access statements to Amigos calls (on a one-for-one basis), reassembling or recompiling, reloading the disk files, and producing new JCL cards.

Amigos can accommodate fixed-length or variable-length records. Handling records of undefined length is not planned for Amigos at the present time. (Availability will, of course, depend on demand.)

Conversion of BAL programs from Isam usage to Amigos usage is a manual procedure. Comress offers a conversion program to automatically convert Cobol programs.

The conversion involves only replacing each BAL or Cobol call to Isam with an equivalent call to Amigos; all replacements are one for one.

Evaluation of Amigos should be considered in three parts: effect on main memory, effect on disk utilization, and effect on performance.

Effect on main memory: Amigos requires only 11,000 bytes of core to hold the resident control coding. This coding includes provisions for random accessing (equivalent to Bisam) and for sequential accessing (equivalent to Qisam).

IBM OS Isam, on the other hand, requires from 3,500 bytes to 14,000 bytes for the Basic method (Bisam) and from 6,300 bytes to 8,000 bytes for the Queued method (Qisam).

Typical usage would be about 11,000 bytes for Bisam and 7,000 for Qisam. Many inquiry-type applications require both Bisam and Qisam portions.

An even larger chunk of main memory can be taken up in OS Isam by the channel programs and control blocks required for each active file.

Approximately 1,500 bytes are required for each file for each of the two methods, Bisam and Qisam. Amigos on the other hand, requires only 600 bytes per file, and that includes both access methods.

DOS Isam requires substantially less core space than OS Isam; in most DOS installations, Amigos will save little core space for control coding and control blocks.

Amigos generates a master index each time a file is opened and stores it in main memory; precise size will vary with the size of the file, of course, but in general only 40 bytes are required for each 2316 disk pack.

Disk Utilization

Disk utilization: The utilization of disk storage space is affected by the elimination of the master index on disk, immediate elimination of deleted records, format of overflow area, and handling of file reorganization due to overflow.

The savings due to not holding the master index on disk will be a few tracks at best.

In Isam, when a record is deleted, it is flagged, but the space becomes available only when the file is reorganized.

In Amigos, a record is physically deleted at execution time by the simple expedient of eliminating it from the block. If a record is added that falls within a block that has an empty space, due to a deletion, then the record is written directly in that block, not in the overflow area.

Amigos blocks records in the overflow area; Isam records them individually. Blocking allows much greater storage density in the overflow area and reduces the frequency with which reorganization of the file is required.

File reorganization is handled dynamically on an individual cylinder basis. As the overflow area for one cylinder becomes filled, that cylinder (prime area and overflow area) is split between two cylinders.

Thus, the overflow space used is proportional to the activity of the various portions of the file.

Of course, all good things come to an end, and eventually Amigos reaches the point where no more file space is available from the initial assignment. The whole file is then reorganized just as in Isam; i.e., a sequential tape is written and the file is reloaded.

Another important point is that the user is not notified when the total space is becoming inadequate, based on a user-input percentage so that reorganization of the file can be planned for a slow period. Isam merely aborts the program when the out-of-space condition is reached.

Performance

Performance: The most spectacular results from replacing Isam with Amigos are in the area of performance. Contributing to the increased performance are holding the master index in core, skip recording, dynamic reorganization, and block addressing.

Isam requires three disk accesses to obtain a record randomly from the prime data area (master, cylinder, and track indexes), while Amigos requires only two (cylinder and block indexes).

If a record is located in the independent overflow area, Isam may require many more disk accesses to get it into core. (The most recent release of DOS permits the master index to be held in main memory.)

Amigos does not record blocks in sequential order on the tracks. Instead, they are recorded every other position, with the second half of the data being put into the spaces thus created. (This is called interleaving with a factor of two, if you wish to be technical.)

The purpose of this is to extend the amount of processing time available between sequential accesses to the data. This is of no advantage in a purely random-access application or in an application which involves updating the records (because you must wait a full revolution anyway so that data can be rewritten).

Comress states that about 6 to 9 seconds are required to reorganize a cylinder. Reorganizing a complete file under Isam varies with the size of the file, but you can count on it taking several minutes minimum.

Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

Block addressing is used in place of Isam's track addressing in the final index stage. Essentially, this means that a block of data is accessed directly. Under Isam, reading begins at the beginning of a track only. On the average, about one-half revolution is saved for each random access.

Extended features: Amigos contains two features that are not contained in Isam or are awkward to implement; floating indexes and generic searches.

Floating indexes simply means automatic assignment of the cylinder index to a lightly used disk drive. A user can do this manually if he desires, but it is a convenience to have it done automatically.

Generic search capability allows accessing groups of records whose record keys contain some but not all identical parameters. Under Isam, this can be done in BAL programs but not in Cobol programs (except by BAL subroutines).

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(see page 18)

'Drawing-Board' 'Copters Play Big Role

STRATFORD, Conn. – Test pilots at the Sikorsky Aircraft Division of United Aircraft Corp. are "flying" helicopters that are still on the drawing board.

Their work is part of a project to design, develop, and test – on the ground – better and safer helicopters for the future.

A DEC PDP-10 digital computer and dual Applied Dynamics analog computers form a hybrid system that simulates – represents the complex physical properties of helicopters by numerous sets of differential, algebraic, and logic equations – such factors as fuselage and rotor dynamics. This permits the determination of an optimum design of the helicopter before its actual physical construction.

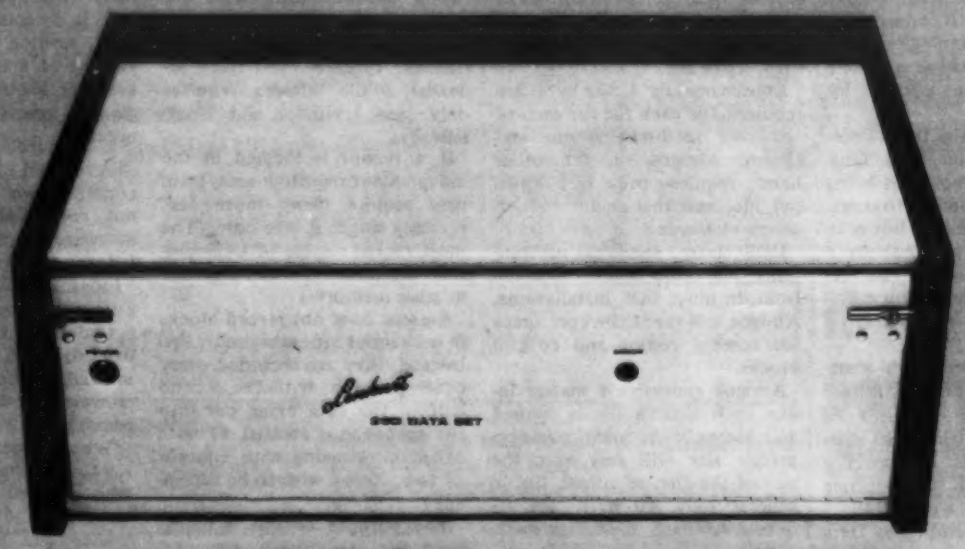
The hybrid system permits the analysis and evaluation of the "flying qualities" of the aircraft on a real-time basis. A test pilot operates the flight controls in a flight simulator that is a mock-up of the cockpit of the proposed model.

The pilot's inputs are converted to dc voltages through transducers on the control sticks and transmitted to the analog computer where they are processed and retransmitted to the computer through an analog-to-digital converter.

These control inputs are then used as forcing functions for the aircraft equations of motion. The highly non-linear helicopter equations of motion describe the performance of the fuselage and rotors throughout the aircraft's entire flight envelope and include such effects as torque limiting, blade flapping and feathering, and change of lift and drag with angle of attack and Mach number.

The equations are solved for the given forcing functions and the resulting motion variables are transmitted back to the analog computer, where they are again processed and retransmitted to the cockpit instruments and displays so as to establish a realistic flying environment.

The subject pilot reacts to this environment as he would react under similar flight conditions and it is then possible to study and evaluate a variety of aircraft configurations and flight situations in a laboratory environment without implementing the actual hardware.



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'Datafile' Holds Marketing Data On U.S. Firms

NEW YORK – A single source of marketing information on all manufacturing establishments is now available on magnetic tape. It may be rented on an annual basis from Economic Informations Systems, Inc. (EIS) here.

Termed "The EIS Marketing Information Datafile," the tape system furnishes key data on 310,000 U.S. manufacturing plants. Its Basic Record shows each plant's name, address and Zip Code; primary 4-digit SIC; secondary SIC where available, number of employees; status as a headquarters, branch or subsidiary.

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'Intercomm' Eases Programming of On-Line Systems

By Don Leavitt
CW Staff Writer

NEW YORK – Users developing on-line systems can expect to save programming time, core storage and processing time with the Intercomm telecommunications monitor from Programming Methods Inc. (PMI).

Available for DOS/360 with upward compatibility to OS, Intercom allows users to write application programs without regard to interfacing with IBM's Basic or Queued Telecommunications Access Method (BTAM or QTAM). No specialized teleprocessing macros are required, according to PMI.

Unlike some other communications monitors, which require use of a particular language for application programs, Intercomm accepts coding in Cobol, Fortran, PL/1 or BAL.

Users seemed particularly impressed with the data collection and dispatcher capabilities that control the internal distribution of messages and determine how the messages are to be processed. Intercomm also schedules and loads the appropriate programs.

Users indicated that to develop these system control capabilities themselves, would require several months of a good programmer's time and even then the result 'probably wouldn't be as effective' as with the Intercomm coding.

Users whose applications require rapid response time to inquiries, feel the dynamic data queuing and multi-thread capabilities are the highlights of the system.

In talking to CW, nearly all the Intercomm users remarked on the 'cooperative' attitude of PMI in helping them resolve problems that arose during installation and implementation of the Intercomm system.

In addition to coping with the user's problems during implementation, PMI periodically provides free updated versions of the monitor system.

Intercomm sells for $50,000.

Programming Methods Inc. is at 51 Madison Ave.

PHI-Datalogue Handles Data on 'Any Size' File

ARLINGTON, Mass. – An information retrieval service that can access data banks 'of any size' is available on a time-sharing basis from PHI Computer Services Inc.

Phi-Datalogue is said to use an entirely new method of file organization to eliminate sequential searches. The result is much faster response to inquiries, the company said.

PHI emphasized that Phi-Datalogue, developed jointly with Computer Corporation of America, is designed strictly for information retrieval. Users cannot, for example, store and access a Fortran compiler with this service.

Phi-Datalogue uses an English command language to access the data base or bases, which are generated by PHI for the user as part of the service. To produce reports, the user specifies exact characteristics or the range in which he is interested.

To handle repetitious requests, the system is able to store series of characteristics identified by number. When one of these reports is needed, the user simply keys in the identifying number and the updated report is produced.

The user is able to update his data base between reports, and a security system is said to prevent unauthorized disclosure of data from the files.

PHI said no monthly minimum billing charge has been set for Phi-Datalogue. Charges for the services will be approximately $12/hr of connect time, and three cent/access to the data base. In addition there will be charges for data base storage ranging from about twenty cents/1k byte/mo for the samller user down to about ten cents/1k byte/mo for the largest.

PHI Computer Services Inc. is at 800 Massachusetts Ave.

CSS Users Get Better Response Time, More Power With Duplexed 360/67s

STAMFORD, Conn. – National CSS Inc. has implemented its time-sharing service on a duplexed 360/67 system and, as a result, users have better response time and more computing power than under the previously available single CPU.

With the dual processors, the user gains access to common data bases from multiple remote sites across a wide geographic area, and hardware backup for all elements of the system, the company added.

Core from both machines is in effect pooled, allowing the system to handle more users simultaneously, and providing more available core for each user that is on the system. In either case, the company noted, the user gains better response time.

Since the 360/67 is a virtual memory machine, physical core limitations are transparent to the user.

Load balancing under duplexing sends all job requests into a single job queue regardless of geographic origin. The system sends the jobs to whichever CPU is available.

A necessity under the load balancing concept, common accessibility of data bases from either or both CPUs also means that two or more of the user's location can work with his files simultaneously. The only restriction lies in the momentary lock put on reading a data field when it is actually being updated, CSS said.

The redundancy of hardware elements inherent in a duplexed system tends to speed the processing when everything is working correctly, the company added. It also means that processing can continue, with varying degrees of degradation of service, if any element, including a CPU, goes down, the company said.

The CSS service marks the first time that the 360/67 has been duplexed for commercial T/S use, according to the company.

National CSS Inc. is at 460 Summer St.

Non-IBM Installations Now Use 'PAC'

KING OF PRUSSIA, Pa. – The Project Analysis and Control (PAC) package, designed to control projects in the data processing department, has been modified to operate on RCA, Honeywell, and Burroughs systems, according to the developer, International Systems Inc. The package was initially implemented only on 360 computers, the company noted.

The system stores and maintains information on all projects and sections of projects currently underway. Normally analysis and programmer activity is reported on a weekly basis.

PAC is 'self-adjusting' and can accept reports of percent of project completion that is at variance with the percent originally estimated to be complete after a certain number of hours. When there is a variation, the system records both actual and estimated percent of completion.

Users report that the system byproducts are also useful. Because the system provides hardcopy reports of each worker's activities, one manager noted that he was able to detect when a programmer was in trouble, before the situation became critical.

The current version, PAC I, is available for $8,500. International Systems Inc. is at the Continental Arms, here.

Facilities Management - Part III

EDS Has Best Reputation and Services

By Malcolm L. Stiefel
Special to Computerworld

Among facilities management firms, Electronic Data Systems (EDS) is the acknowledged leader. Since 1962 the company has had an amazing growth record – entirely in the facilities management – and yet the firm avoids use of the term.

The main source of EDS' strength lies in the combined skills of their systems engineering staff.

Next to its staff, the most striking characteristic of EDS is its concentration in just a few industries – health care, life insurance, etc.

By maintaining this narrow focus, EDS is able to use many computer programs over and over for different customers, to save development costs. Still, an EDS spokesman estimates that 10% to 60% of the application programs for new clients are developed from scratch.

When EDS approaches a new customer, it usually begins a month-long survey paid for by the customer. EDS then submits a detailed proposal.

> Facilities management has been described as data processing services combined with management consulting. But a universal definition does not exist.
>
> In this series, CW examines this growning field in some detail, describing how facilities management works and its impact on the user.

If this overture leads to a long term contract, EDS moves into the customer's offices, hires the entire data processing staff, and begins to control the EDP operation.

After several months, EDS completes a systems design, which is implemented when the contract is initiated. The new system uses hardware at an EDS center which serves the customer's industry.

Typically, source data terminals and pooling devices are installed at the customer's site for remote access to the EDS center.

Malcolm L. Stiefel is an independent consultant with extensive experience in systems analysis, design and evaluation. He is currently engaged in studies dealing with inventory control,

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AT&T Rate Hike Would Hit Long-Line Dial Data User

By Don Leavitt
CW Staff Writer

WASHINGTON, D.C. – AT&T has filed with the FCC for increases in interstate long distance telephone rates, to go into effect in mid-January. Some data users would be affected.

The user who needs operator assistance will be hardest hit under the filed plan, while the user who makes direct-distance-dial calls during normal business hours will also see a jump in his tolls, in spite of an AT&T comment that 'lower rates are justified for calls the customer dials himself.'

Communications

Wats and leased line rates are not affected by this filing and therefore the effect on most long-line data users is expected to be minimal. But users of acoustically coupled data equipment on the dial-up network would be affected.

The filing reverses a long-standing AT&T pattern by which interstate rates had remained stable while intrastate rates had gone up. This is the first general increase in interstate long distance rates in 17 years, according to AT&T. Bell had recently reduced some long line rates, claiming that operating costs were decreasing.

The FCC could block the increases for 90 days and order a hearing if it decides the new rates are not justified.

Rule Requiring Supporting Facts Could Delay Decreases, FCC Told

CW Washington Bureau

WASHINGTON, D.C. – Three common carriers have petitioned the Federal Communications Commission for reconsideration of a ruling that would require 60 days notice for all tariff changes.

The petitions were filed by American Telephone & Telegraph Co., Western Union Telegraph Co. and Western Union International Inc.

The FCC recently revised its rules to gain more time and data on tariff changes. Tariffs providing a change of rates would be filed at least 60 days prior to the effective date, according to the new rules, and must be accompanied by three-year cost projections in supporting economic data. These requirements would apply whether the proposed change is an increase or a decrease in rates.

AT&T said that the new rules would impose "costly and burdensome requirements," and compliance "verges on the impossible."

Western Union claimed that while a carrier was preparing the necessary supporting data, his customers could shift to the lower rates of a competitor.

Line Monitor Device Bypasses Circuit Failure

WASHINGTON, D.C. – A device that continuously monitors any private or dial communications line, and establishes a new circuit in case of line failure, has been developed by Timeplex, Inc.

Called the Automatic Fallback Unit (AFB), the unit can dial an alternate circuit in case of disruption or on command. In a dedicated communications system, if the original circuit is restored, the back-up dial connection is automatically broken and communications proceeds again over the leased line.

The AFB puts a tone on the line that is below the data pass band (320hz). Another AFB, at the other end of the line is used to detect this signal.

The price for a system of two AFBs will be under $2,000.

Timeplex, Inc. is at 1522 K St. N.W.

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RCA

Low-Cost Key-Disk System Uses PDP-11 and KSR-33s

By Frank Piasta
CW Staff Writer

DALLAS – Eclectic Corp. has combined a PDP-11 minicomputer with a 3211-compatible disk drive, a data concentrator, and the 33 KSR Teletype to produce a low-cost data-entry system.

Called the 1140 Key-Disc system, it can handle as many as 32 local or remote TTY data entry stations.

In place of the teletypewriter, keyboard-equipped, CRT terminals from Delta Data Systems (Delterm 2's) may be attached.

The video displays, the company said, enable forms to be called for display and variable data entered by the operator. Only the variable data is stored on the disk pack.

The processor is used to perform most overhead tasks and keep supervisory intervention at a minimum level, the company said. The system is capable of performing preliminary editing, table look-up functions and preliminary verification. Eclectic said it will furnish each user with software to meet his particular application needs.

The system may be equipped with one or more A.B. Dick Videojet printers in order to furnish hard copy when the CRT terminals are used.

Another option to the system is a magnetic tape drive. Data may be captured from the disk onto one-half inch, IBM-compatible tape. Models capable of seven-track at 556 bit/in. and nine-track at 800 bit/in. are available.

A basic 1140 system with 10 Teletype stations is priced at approximately $60,000. First systems are scheduled for delivery in February, 1971.

Eclectic Corp. is at 2830 Walnut Hill Lane.

DEC Tape Drive Features 7- and 9-Track Models

MAYNARD, Mass. – A magnetic tape drive system from DEC that uses one-half in. tape on standard reels, for use with the company's 12-bit computers is available in either 7- or 9-track models.

The TR05-A controller and TU68 tape transport are designed for use with the PDP-8 family, as well as the Linc-8 and PDP-12.

The tape unit is available in three versions. The 7-track TU68-A has a recording density of 200 or 800 bit/in., the 7-track TU68-B can record at 556 or 800 bit/in., and the 9-track TU68-C can read and write at 800 bit/in.

Transfer rates of the three models are 7,500 char/sec at 200 bit/in., 20,800 char/sec at 556 bit/in., and 30,000 char/sec at 800 bit/in. The three drives have a uniform tape speed of 37.5 in./sec.

The controller is available in two versions, with a capacity of either one or two drives.

DEC will supply systems software to support the new tape units. This includes diagnostic programs and an I/O handler. According to DEC, user programs designed for the company's TC58 controller are easily adapted to the new device.

The one-drive version of the TR05-A carries a price tag of $5,800, while the two-drive version sells for $6,800. The TU68 sells for $4,800 for each of the three models.

The units are currently available on a 60-day delivery schedule.

Beckman Code Converter Connects BCD Input to Ascii Teletype

FULLERTON, Calif. – A coupler designed to convert digital BCD input of up to 16 bits into an Ascii format directly suitable for an ASR-33 Teletype has been introduced by Beckman Instruments, Inc.

Designated the Auto-Pro 3109 Intercoupler, the instrument provides output in a direct entry format for most data processors, including timesharing.

Two types of operational controls are available with the unit: Direct from front panel pushbuttons; and remote through external contact closures to ground.

The 3109's operational and set-up controls provide flexible operation through initiation of data transfer and recording, recording of two-digit sample numbers for series identification, and selection of intervals between successive readings.

The price of the 3109 is $1,825. It is available with an ASR-33 Teletype for $3,025. It is currently available from stock, the company said.

Beckman Instruments is at 2500 Harbor Blvd.

Cassette Recorder From Terminal Data Has Acoustic Coupler

KENSINGTON, Md. – A Cassette recorder from Terminal Data Corp. is designed for use in time dependent applications.

Called the Model 805, the recorder is meant for applications where continuous tape movement is required.

The recorder is equipped with an acoustic coupler. An option is remote digital control that allow the unit to be operated from a remote location.

The Model 805 is compatible with the 33 ASR Teletype, according to the company.

The device is priced at $995 and is available on a 30-day delivery schedule. Terminal Data Corp. is at 4118 Howard Ave.

Infoton Vista Line Adds 80-char/line Teletype-Compatible CRT Terminals

BURLINGTON, Mass. – The Vista 1 series of CRT terminals has been expanded by Infoton, Inc. with the addition of two models that display 80 char/line.

All models of the Vista series are designed to be plug-to-plug replacements for Teletype models ASR-33 and -35.

The Vista 1-G and 1-H feature an erase-to-end-of-line feature that allows part, or all, of any line to be erased by the positioning of the cursor at the left end of the portion to be erased.

Other features include line control of page and roll mode, and multi-speed output.

The two models differ primarily in screen capacity. The 1-G is a ten-line unit while the 1-H can display 20 lines.

A nine-speed interface is provided, with speeds switch selectable. Speeds range from 110, to 4,800 bit/sec. Either an EIA RS 232-B or a current loop interface is provided. Three modes of parity are switch-selectable: even, odd, or logical one.

The terminals are equipped to handle two external clock inputs. An I/O clock permits the use of the terminal with synchronous modems. An 8-times clock allows the terminal to be directly connected to such minicomputers as the DEC PDP-8, Infoton said.

Several options are available at extra cost. A printer interface and answer-back option are available. A parallel interface, allows the CRT's to be used as a computer peripheral device.

The price of the Vista 1-G is $2,595, and the 1-H costs $2,995. Infoton, Inc. is at Second Ave.

Vista 1 CRT Terminal

Singer COM Has 24-bit Word Mini, Meant for Graphics Applications

SUNNYVALE, Calif. – Singer-General Precision's Link Division has combined a microfilm printer/plotter with a 24-bit/word computer to produce a stand-alone system for advanced graphic applications.

Based on the company's previous MS-5000, the MS-6000 substitutes a computer for the earlier 4K buffer.

This facilitates the development of optimized software for applications and conversions making it suitable for use in reports requiring graphics and charts, map updating, flow charts, logic diagrams, and other applications, the firm said.

The MS-6000 is primarily a graphics device with expanded page-printing and typesetting capabilities. Input data can come from such sources as magnetic tape, punched cards, keyboards, paper tape and/or directly from another computer through an interface.

Three upward-compatible versions of the system are offered, varying primarily in the computer they incorporate. The MS-6010 uses a processor with a cycle time of 1.2 μsec and is available with memory capacities from 4K to 32K words.

The MS-6020 and MC 6030 are available with from 8K to 65K of core. Multiply, Divide, and Square Root hardware, optional on the MS-6020, is standard on these.

While the plotting and graphics programs are used in the foreground, the user can use the processor's background mode as a general-purpose computer.

In addition to plotting packages, Singer will provide an assembler, a Fortran IV compiler plus utilities and diagnostics. All are controlled by either a resident or a disk operating system.

The price of a typical MS-6000 is $240,000. The system is available on a six-month delivery schedule.

The Link Division of Singer-General Precision, Inc. is at 1077 E. Arques Ave.

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(see Page 18)

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TDCC Calls for Standardized Data Codes

WASHINGTON, D.C. – Standardization of information interchange by all shippers, carriers, banks and government agencies, nationally and internationally, is a vital step toward the "paperless transportation system" and toward an understanding of a common business language.

These were some of the remarks of Donald Chickering, vice-president of marketing for Flying Tiger Line, speaking on airline dependence on computer data systems before the Transportation Data Coordinating Committee seminar at the Statler Hilton Hotel.

National transportation authorities spoke on the theme of "Computerization of Transportation Data and Information Systems."

Speaking from the standpoint of shippers, John C. Howard, vice-president of traffic for Bethlehem Steel Corp., said:

"The transportation industry does not have a common language that permits the full utilization of today's data processing and communications systems. Individual carriers have developed their own codes. Because of this, in some cases, one carrier cannot mechanically communicate with another even in the same mode of transportation.

"Even when a substantial number of carriers in the industry do agree on a standard coding system, that system may not be compatible with the coding system used by other transportation modes,"Howard continued.

Readily available computerized information should enable shippers to forecast transportation equipment needs much earlier and in more detail than is possible now, he said. And most important, Howard stressed, this information could be transmitted to carriers in a standard format.

Clifford Buys, executive director of the American Trucking Association, management systems committee, echoed Howard's call for standardized data codes: "Standardized data codes and communications procedures are required if each shipper-carrier data connection is not to be a unique system problem."

Societies

Postage Stamp Urged by DPMA

PARK RIDGE, Ill. – A U.S. postage stamp commemorating the computer and data processing industry has been recommended to government officials by James D. Parker, Jr., CDP, DPMA international president.

Parker pointed out that DPMA is entering its 20th year in 1971 and the commemoration of computer technology during that year by means of an appropriate U.S. postage stamp would be fitting recognition of the many contributions the EDP industry has made to society.

His recommendation was sent to members of the Senate and House Post Office Committees. Industry leaders are requested to lend their support to this proposal by writing to Postmaster General Winton M. Blount in Washington and urging his support.

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(Sure, George, who's going to lay a new transatlantic cable for us?)

"And" he continued, "I only want the customer to have to pay for a local call."

(That had to be a put-on, but he's the boss. Did he have *any* ideas on how we pull this off?)

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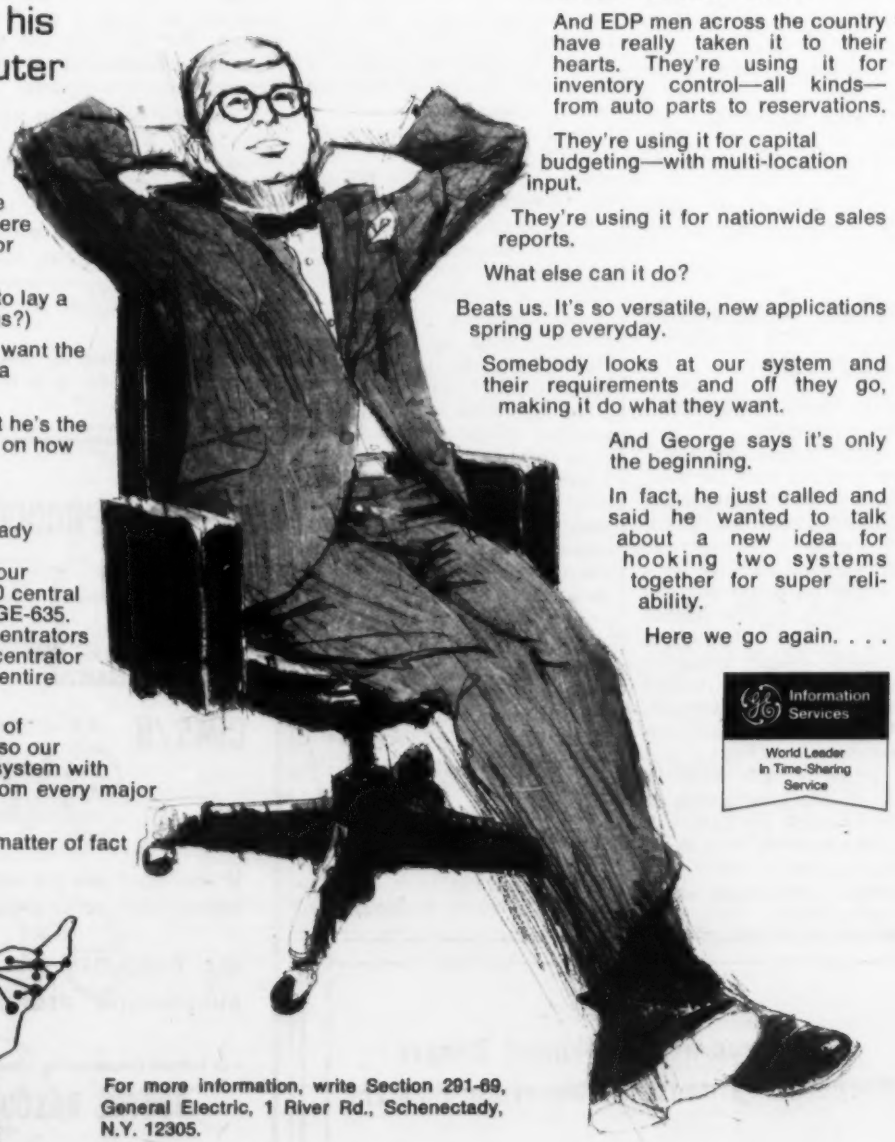
"You get it?", he said. As a matter of fact we didn't.

So he drew this diagram.

George's drawing



Then he said, "Do it. And use a satellite to get to Europe. It'll be the Time-sharing system that only EDP people can love."

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computer industry

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December 2, 1970

IBM, Agree on Repossession

WASHINGTON, D.C. – Users who have their IBM equipment repossessed by the manufacturer may get financial help as a result of an agreement between IBM and the Department of Justice.

The manufacturer and the government have agreed to submit for court approval a proposed modification regarding repossession of equipment in Justice's 1956 consent decree with IBM. The proposed amendment would bring the provision into conformity with the uniform commercial code in every state except Louisiana.

Attorney General John N. Mitchell said that the proposed modification was filed in the U.S. District Court in New York City. The modification has no effect on the computer antitrust suit filed by Justice against IBM in 1969.

Under the 1956 judgment, IBM could offer repossessed equipment for resale at a price no higher than 85% of the original price, discounted at the rate of 10% per year based on the age of the machine. This price, according to Justice, may be less than the fair market value.

Under the modification, therefore, IBM would be permitted to sell repossessed equipment at the highest price it could get. Money received above the defaulting user's debt would be returned to the user, and thus could very well be more than the amount returned to him when IBM was limited in its resale percentage.

Judge David Edelstein of the U.S. District Court for the Southern District of New York has asked that the proposed modification be held with the records of the 1956 consent decree for 30 days prior to submission for his approval. This will allow interested persons to inspect it and submit their views to the Justice Department and the court.

Critique on 'Blue Ribbon'

DP Utilization at DoD Reviewed

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – Reverberations are still being heard in government offices from the Blue Ribbon Defense Panel report which criticized the automatic data processing setup within the Department of Defense as well as other aspects of DoD's operations.

The report, issued by a Presidential task force headed by Gilbert W. Fitzhugh, was disclosed last summer. Since then, various other reports and commentaries concerning the Fitzhugh document, have been circulating [CW, Oct. 21, Nov. 18].

The latest report is an analysis that was authored by one group within DoD concerned with ADP. The analysis was in response to an original draft of the Blue Ribbon report circulated prior to publication of the final version last July.

The analysis dealt with utilization and sharing of computers, a common system design, and management.

The Fitzhugh report said that utilization rates of computers owned and leased by DoD were estimated at between 50% and 60%. The analysis indicated a decidedly different figure, based primarily on the fact that Fitzhugh's group averaged large-scale with small-scale systems.

Different Figure

"While gross statistics shows that overall [DoD uses] hardware 50% to 60% of the total hours available," the analysis said, "the utilization is 70% to 80% for the larger systems.

"This means that the potential for better utilization lies in the smaller, less expensive hardware, much of which is dedicated to specific functions such as Autodin terminals, etc., and is not subject to much improvement."

The analysis continued: "One way of looking at the potential improvement through better utilization and sharing is to compute the approximate cost of unused ADP hours. This was done by pricing out the cost per hour of each computer and computing the time available for sharing that wasn't used."

The figure arrived at was $3.2 million/mo; and the potential saving through elimination of excess equipment would be $37.4 million "if every hour of available time on every computer was fully utilized."

What followed was an analysis of one of the obsolete classes of computers still being used by DoD – the 25 Control Data G15Ds installed. They are government-owned machines, and have low utilization rates with an average monthly maintenance cost of $263.

"Obviously," the analysis concluded, "replacing this capacity would not have much economic impact. We should certainly get rid of older, less efficeint ADP [equipment], but it is unlikely that any immediate or substantial cost reduction will accrue."

Sharing of hardware, according to the analysis, is increasing substantially – from $11.9 million in fiscal 1967 to $27 million in fiscal 1969.

Challenging Issue

Tha analysis also differed in emphasis with the Fitzhugh report on design and development. The commentary called for design and development of standard DoD ADP systems, adding that this is the most challenging issue facing the department.

"The history of ADP development clearly shows the need for progressive standardization . . .System design and implementation are becoming increasingly expensive, and we continue to redesign and reprogram our systems," the analysis stated.

The Fitzhugh recommendation, added the analysis, "mainly attempts to speed the development of hardware interfaces and machine independence."

The analysis agreed with Fitzhugh that stronger centralized control is needed to improve ADP management within DoD. However, it added that "it is not at all clear that complete control of hardware is needed."

Most Employees of Computer Operations Work on a No Pay Basis, for 4th Time

COSTA MESA, Calif. – Computer Operations, Inc. (COI), a young company attempting to build a "fourth generation" computer for delivery in 1972, once again is in money trouble with most of the employees on a "no-pay" basis.

Of the 104 employees, layoffs have cut the work force to 80. All the engineers are staying and several groups of "money men" have been in the plant looking things over, the firm said.

This is the fourth time that employees have gone without salaries in the 22 months of the company's short life, which so far has landed investments of $1.6 million.

The COI board of directors and technical advisors reads like the who's who of computerdom, and includes Dr. Richard Tanaka, president of Afips, and Dr. Sidney Fernbach of Lawrence Radiation Laboratories. All financing has been done by staff members and private placements.

COI was incorporated in January 1969 and hopes that its Gemini computer can replace IBM 360s and 70s for multiple large-scale users when operational. The reputation of the planned Gemini is such that it is now number three on the embargo list of computers that cannot be shipped to Russia because of the advanced technology used.

"The average experience of our employees in this industry is 10 years. In addition we put everyone through a six weeks' training course to bring them up to speed. We're the only company outside of IBM that does this," according to David L. Stein, vice-president of marketing.

In the planned system, a single CPU system executes more than 1 million instruction/sec in IBM 370 emulation mode, and more than 2 million instruction/sec in Gemini mode [CW, Aug. 19]. A two CPU system doubles these speeds.

'Tracom' System to Gather Management Information

ST. PETERSBURG, Fla. – A point-of-sale entry system designed for the fast-food industry from Honeywell Information Systems combines an electronic cash register with the ability to accumulate management information.

The Tracom (Transaction Communicator) system incorporates a Honeywell H112 minicomputer to provide each store with its own system of up to 10 terminals.

The system is designed for use in a limited-menu food service environment. The keyboard is arranged so that the operator is required to enter only the menu item and quantity. From nine to 40 menu items can be accommodated. Prices are pre-set by the store manager.

The system, Honeywell said, can capture up to a week's sales, inventory, tax, and employee labor information in the H112. This data is available to the manager through any terminal when it is operated in the management mode.

The price of the basic Tracom system with two terminals is about $12,000, depending on customer needs, configuration, and quantity. First deliveries are scheduled for the second quarter of 1971.

Independent Memories Gain Approval

By Eugene A. Kruschke
Special to Computerworld

CULVER CITY, Calif. – The market of IBM-plug-interchangeable large core storage (LCS) units produced by independent manufacturers exceeds $300 million.

That potential value is a conservative estimate based on the present number (3,000+) of IBM 360 installations which can use independently produced extended core memories ("independent memories") in increase performance profitability.

The dollar figure is conservative, since as many as eight of the high ticket extended memories (they cost almost $300,000) may be added to single 360 systems.

At the present time, for example, 35% of the large memories in operation are part of multiple-unit installations, indicating the popularity of interleaving units.

This potential has attracted at least three firms: Ampex, Data-Products and Fabri-Tek. While IBM seems content to continue marketing its Model 2361 large core store unit, the independent has advanced the cause of extended core considerably.

The independent manufacturer offers improved price/performance ratios to DP managers who replace their IBM large core store units with independent memories for these reasons.

With independent memories, DP managers can create new low-cost systems with high throughput.

These advantages are the keys to the independent's success and should continue to attract cost-conscious users in the future.

It is an economic fact of life that a large number of existing 360s will continue operating with updated peripherals long after the first 370s are installed.

The independent memory will further enhance the industry as an essential and economical extension of the 360's usefulness and application.

The high-speed, one million byte independent memories enable users to reduce the size of their costly mainframe memory while maintaining or increasing their throughput rate. This is possible because data must "roll in" and "roll out" of mainframe storage to be processed.

However, by using an independent bulk core storage memory, more data is retained in the Mbyte bulk core storage area, thus minimizing "roll" delays. The DP manager also saves money since the improved bulk storage costs less than the main memory which he replaced.

He is unable to use the IBM large core store unit as profitably, since the 2361 cycles at 8 μsec compared with 4 μsec or faster with the independent's memory. As a result, many IBM large core store users are switching to independent memories and getting a minimum of twice the speed.

Speed is particularly important for time-sharing companies, who are able to handle twice the number of clients without increasing their costs.

As an added bonus to both the independent suppliers and their customers, recent experience has shown that interleaving two units reduced full cycle time even more.

Mr. Kruschke is extended core memory product manager at Ampex Corp.

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Control Data Unveils Tape Transports, Printer, Disk Drives, Storage Units

MINNEAPOLIS – Control Data Corp. has introduced new OEM peripheral products, including mass memory devices, magnetic tape transports, and a 200 line/min drum printer.

Control Data's new family of mass memory storage equipment includes the CDC 9736, 9740 and 9750 voice coil disk storage units; the CDC 9425 cartridge disk drive; and the CDC 9081 control unit.

The CDC 9736 disk storage unit has the features and capabilities of the CDC 9482 multiple disk drive with the addition of an access time averaging 35 msec.

The device uses an 11-high disk pack with 31 million bytes on 20 magnetic oxide coated surfaces.

Head positioning is performed by a closed loop proportional servo system. Lateral movement is provided by passing current through a coil mechanically coupled to the head carriage. The carriage is driven by an electromagnetic voice coil linear actuator.

The CDC 9740 and CEC 9750 units are similar to the 9736, featuring voice coil drive, center of gravity design, track decrement counter and emergency retract system.

Capacity of the 9740 is 59 million bytes, with an average access time of 35 msec. The unit offers double frequency recording mode, 200 track/in., 2,400 rpm spindle speed, data transfer rate of 2.5 MHz and a single channel interface.

The CDC 9750 has a capacity of 107 million bytes, with an average access time of 30 msec. Data transfer rate is 6.8 MHz, and spindle speed is 3,600 rpm.

The CDC 9425 cartridge disk drive utilizes standard disk cartridge media suitable for mounting on 19-in. relay racks.

It has a capacity of 3.13 million bytes. Optional features are available that would double this capacity, CDC said. Average access time is 35 msec, and data transfer rate is 2.5 MHz.

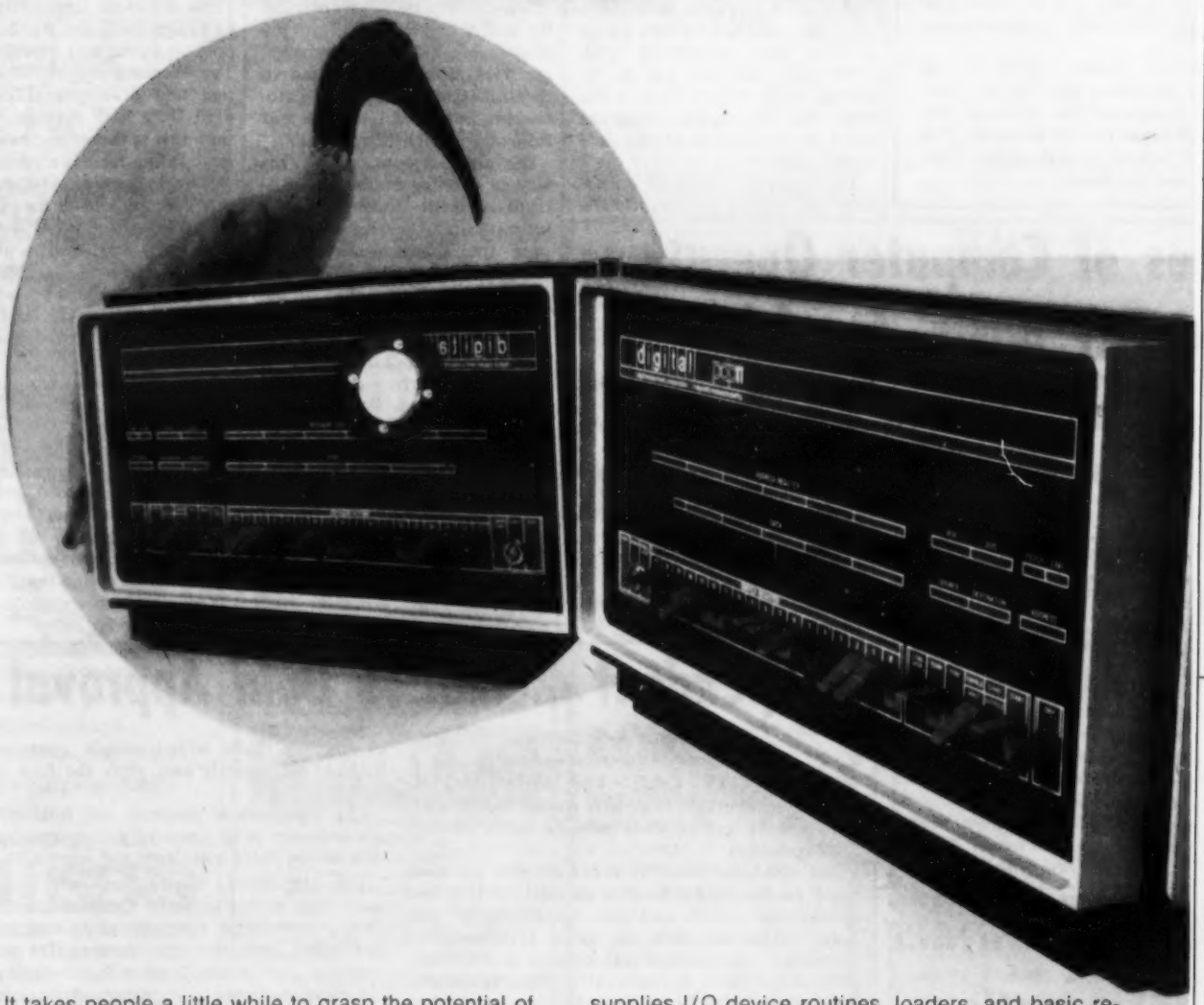
The CDC 9081 plug compatible control unit, along with disk storage unit subsystems, provides the user with a device capable of a transfer rate of 312,000 byte/sec.

The 9081 control unit can be interfaced between CDC 9736-9737 voice coil disk storage units or CDC 9482-9483 hydraulically driven multiple disk drives and other manufacturers' systems.

The CDC 92000 series tape transports are IBM plug interchangeable designed for heavy duty applications.

The CDC 9320 line printer, a 200 line/min impact printer for table-top mounting, can be used with terminals or as an output device for the minicomputer. Paper capacity is from 3-1/2 in. to 10-5/8 in. wide by 22 in. to the fold.

The new PDP-11 Disk Operating System shows how really big a 16-bit computer can be.



It takes people a little while to grasp the potential of the PDP-11 16-bit computer family. Simply because PDP-11 design looks ahead for years – not just to the next red-hot mini-computer.

You can buy any small, medium, or large PDP-11 system. One of them is for your problem of today – from dedicated OEM to multi-user timesharing. When tomorrow comes you discover that the whole family is compatible – that you can upgrade, add on, expand, change – by literally plugging in memory, I/O devices, software, or even a more advanced central processor. That's looking ahead. That's family planning.

Latest member of the PDP-11 plug-in family is a Disk Operating System – random access files capable of expansion to 160 million 8-bit bytes. The DOS makes PDP-11 sing. You create, debug, and edit with simple commands while a monitor takes care of the tedious work. During the program run, the monitor supplies I/O device routines, loaders, and basic resources accounting. Everything is easier and faster because your software, your program, and your files are resident on the high speed disk. And DOS will play 1130-compatible FORTRAN IV. Keyboard or batch.

The DOS gives you leverage to exploit PDP-11's extraordinary power – power that has been lying waiting in the basic 11 all along. UNIBUS™; 400-plus instructions; 8 general registers; bit, byte, and multiword capability; hardware stacking; automatic nesting of interrupts and subroutines; re-entrant and relocatable code; core up to 256K 8-bit bytes. This is computer architecture that makes PDP-11 the pace-setting mini-computer.

Mini only in price, though. PDP-11 Disk Operating Systems start below $30,000.

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HOW do things look for the computer industry as the pause in growth apparently is ending?

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Sales Questioned

Memorex Backs Accounting

SANTA CLARA, Calif. – One paragraph of Memorex Corp.'s unaudited third quarter report has stirred up a great deal of controversy.

The paragraph in question says that Memorex included $14.1 million of peripheral equipment in its corporate revenues even though the equipment had only been transferred to Independent Leasing Corp., a Memorex creation that has not yet been fully capitalized.

Memorex hopes to finish financing the company by the end of the year, but "Payment to Memorex . . .is dependent upon the success of such efforts . . .If for some reason not now anticipated it is not satisfactorily completed, Memorex will pursue alternative financing for leases of its equipment; the effect of any such alternative upon reported sales and earnings cannot be determined."

Revenues up 44%

The peripheral maker reported revenues of $79.1 million, up 44% from 1969's $54.8 million for the nine months, and net income of $6.1 million, or $1.64 a share, up 27% from $4.8 million or $1.31 a share.

Deleting the questioned $14.1 million from revenues would leave a sales growth of 18.6%.

Trading in Memorex common on the New York Stock Exchange was halted after release of the nine-month statement because of a large influx of buy orders and requests for clarification of Memorex's accounting procedures.

Sales of leases to permit entry of the total value of equipment in the revenues column is a common practice. Since the ILC subsidiary does not yet have sufficient assets to purchase the equipment, however, such accounting would not be permitted in an audited, year-end report.

The nine-month report is unaudited.

In response to criticism of the procedure, Memorex said that the report is "a fair statement of sales and profits" even though they may have to be restated.

Its accounting "avoids a substantial distortion of . . .third and fourth quarter earnings," the company noted.

The firm's auditors, Arthur Andersen & Co., have said that the sales to the affiliate may be counted "if and when the financing arrangements" for Independent Leasing are completed "in the manner contemplated."

Memorex declined to disclose how close the financing arrangements are to completion.

COMPUTERWORLD

financial

Sales up, Earnings Down at HP

PALO ALTO, Calif. – Preliminary figures reported by Hewlett-Packard indicate that the company had a 7% increase in sales and an 11% decline in earnings for the fiscal year ended Oct. 31.

Sales totaled $347.9 million, compared with 1969 sales of $323.8 million. Net earnings amounted to $22.8 million, equal to 89 cents a share.

This compares with earnings of $25.6 million, equal to $1.01 a share, in 1969.

The 1969 figures have been restated to reflect the company's two-for-one stock split that occurred last February.

The company's incoming orders totaled $350.4 million in 1970, a gain of 2% over orders of $344.4 million booked in 1969.

"Reflecting the general softness in our domestic markets, orders from U.S. customers amounted to $211.8 million in 1970, down 12% from the previous year," President William Hewlett said.

On the other hand, he said, international orders were up 32% to $138.6 million. Our international business now represents about 40% of our total business."

Hewlett said in view of the current economic recession in the U.S., "it is unlikely that we will experience any substantial growth in our total business in 1971."

Ampex 2d Quarter Falls 'Substantially' Below '69 Results

REDWOOD CITY, Calif. – Ampex Corp. sales and earnings for the second quarter and six months ended Oct. 31 were "substantially below" those of the comparable periods a year earlier.

Sales for the second quarter totaled $74.4 million compared with $80.7 million in the second quarter last year. Net earnings were $861,000 compared with $4.3 million. Earnings per share were 8 cents compared with 40 cents.

For the half year, sales totaled $138.9 million down from $149.3 million. Net earnings were $1.4 million compared with $7.4 million. Earnings per share were 13 cents compared with 69 cents.

"Orders continue to be slow in several product areas as a result of the depressed economy. In addition, we are just beginning to make meaningful shipment of our third generation teleproduction equipment to our important broadcasting markets," Ampex chairman William E. Roberts said.

C&S Extends Service To Canada Exchanges

LOS ANGELES – Computing and Software, Inc. (C&S) has announced a contract under which it will computerize the processing of financial and statistical information for the Montreal and Canadian Stock Exchanges and produce timely reports of market activity for various financial media.

Norman E. Friedmann, C&S president, said RCA Spectra 70/45 and 70/46 systems, recently installed at the firm's Canadian subsidiary, Aquila-BST, Montreal, enable the exchanges to increase their workload capabilities by 300%.

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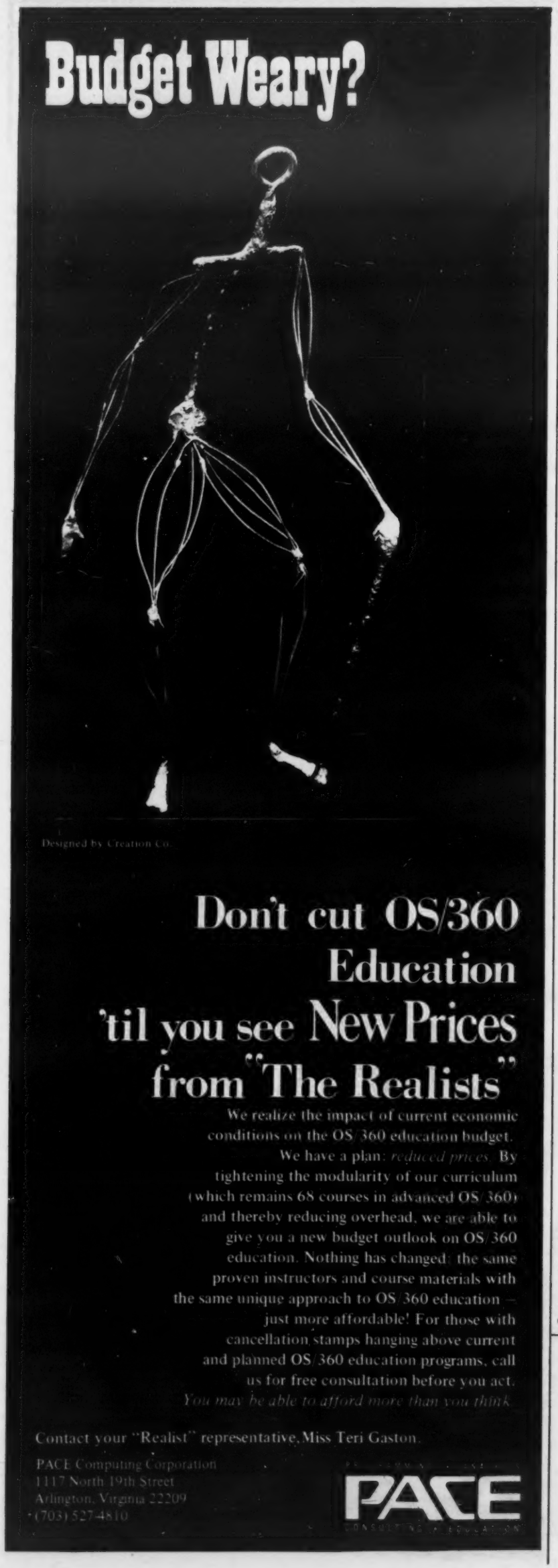

PMI 3d Quarter Revenues Rise

NEW YORK – Programming Methods, Inc., a computer systems and proprietary software firm, reported third quarter increases of 53% for both revenues and net income over the corresponding period last year.

Nine-month revenues were 36% ahead of the 1969 period, and net income for the first nine months was 42% ahead.

PMI third quarter revenue increased to $1.5 million from $1 million for the comparable quarter of 1969. Net income was $142,935, or 17 cents per common share, in comparison with $93,724 or 11 cents a share for the same period last year.

For the nine months ended Sept. 30, revenues increased to $4.3 million from $3.2 million reported in 1969. Net income was $404,599, or 48 cents per common share, in comparison with $284,801, or 34 cents a share for the same period last year.

The record revenues and earnings were established for both the third-quarter and nine-month periods as a result of internal growth within each of the company's four operating groups, according to PMI.

The operating results do not include the recently announced acquisition of certain government contracts formerly held by bankrupt Computer Applications Inc.

In the transaction, which was effective Oct. 1, approximately 220 Computer Applications scientists, analysts, and programmers joined PMI, increasing the PMI staff to 470.

General Telephone & Electronics Corp. owns approximately 74% of the outstanding shares of Programming Methods, which is one of five organizations forming the nucleus of the recently announced GT&E Information Systems Inc., a subsidiary of General Telephone & Electronics Corp.

Acquisitions

National Sharedata Corp., Dallas, has agreed in principle to acquire **Automated Data Processing, Inc.** and **Financial Computer Services, Inc.** from Coaches of America, Inc., El Paso.

When completed, the merger would involve consolidation of the two DP service firms and National Sharedata Corp. into the new State National-Sharedata Center, an operating division of National Sharedata.

Data Card Corp., Edina, Minn., has acquired the stock of **Data/Name/Inc.**, a New York City firm, in exchange for an undisclosed amount of Data Card stock. Data/Name/Inc. provides computerized direct mail services; Data Card has developed a high-speed card embossing machine.

Magnecomp, Inc., Mountain View, Calif., has acquired **Jensen Munro**, a disk manufacturer. Magnecomp produces plated disks and drums for memory systems and plans to manufacture a complete magnetic memory disk from the raw material through plating.

Computing and Software, Inc., (C&S) has acquired **Cassidy-Richlar, Inc.**, Philadelphia, and its San Francisco affiliate, in exchange for cash and C&S common stock in excess of $3 million.

Cassidy-Richlar provides a range of direct marketing services to consumer product manufacturers and retailers. C&S is a business information company.

Data Conversion Corp. of America (DCCA) has become a subsidiary of **Geodatic**, a computerized marketing services company. The transaction was for an undisclosed amount of stock. DCCA operates keypunching and verification centers in the New York area.

Computer Complex, Inc., has completed the sale of its interests in **The Analysts, Inc.**, to The Analysts Holding Co., Inc. The value of the transaction was not disclosed.

Western Union Corp. has completed arrangements to acquire the **Distronics Corp.**, Cherry Hill, N.J., which offers on-line processing services for plumbing and electrical supply distributors in the eastern U.S.

Under the terms of the agreement, Distronics will operate as a WU subsidiary. The acquisition calls for an exchange of WU common stock for all the capital stock of Distronics in early 1971, and provides for issuance of additional shares depending on future earnings of Distronics.

URS Systems Corp., San Mateo, Calif., has entered into an agreement to acquire **Computer Programming, Inc.**, of Greenville, S.C. URS said the purchase price would be determined by CPI earnings over the next two years, and payment would be in URS stock.

Input, Inc. of Highland Park, Ill., has acquired the business of **Public Data Processing Corp.**, a division of Brandon Applied Systems, Inc.

Unidat Corp. has agreed in principle to acquire **Pioneer Leasing Corp.**, Las Vegas. The transaction is subject to the approval of stockholders. PLC furnishes financial leasing services through regional offices.

Computer Complex, Inc. has been acquired by **Anderson Jacobson, Inc.** of Sunnyvale, Calif.

Computer Devices, Inc., Cambridge, Mass., has merged into **SDM Corp.** of Woburn, Mass., and will operate as a division of the latter firm. Computer Devices manufactures portable computer terminals.

Computer Tunes in Youth

ROBBINSDALE, Minn. – The Rev. George Macauley had his youth group answer questions as part of a computerized survey. Based on the responses of the group, he instituted a series of talk sessions with adults, and abandoned Sunday School classes, and discontinued the regular youth group meetings.

The survey, designed by the Youth Research Center, costs $3 for each person. The two books included contain statements, to which the person responds using any of five choices, from "strongly agree" to "strongly disagree."

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(see Page 18)

TRADE*QUOTES

Computerworld Stock Trading Summary

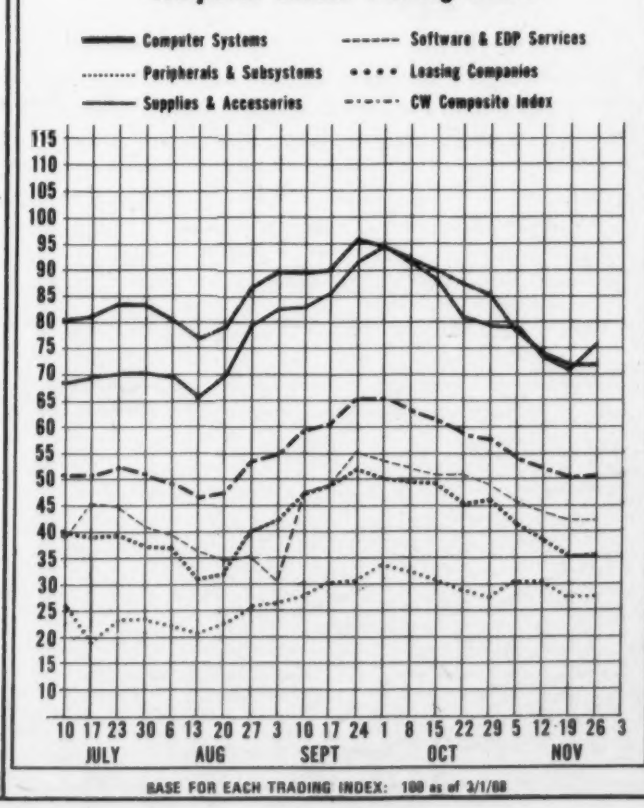
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02138

CLOSING PRICES NOVEMBER 25, 1970

EXCH		1970 RANGE (1)	CLOSE NOV 25 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	1 3/4	- 1/8	-6.6
A	APPLIED DATA RES.	4- 24	5 1/4	- 1/4	-4.5
O	APPLIED LOGIC	1- 19	7/8	- 1/4	-22.2
O	ARIES	1- 8	1 3/4	- 1/4	-12.5
A	AUTOMATIC DATA PROC	23- 47	43 1/4	+2 3/8	+5.8
O	AUTO SCIENCES	3- 14	4 7/8	- 3/8	-7.1
O	BRANDON APPLIED SYS	1- 9	1	- 1/8	-11.1
O	COMPUTER AGE INDUS.	1- 3	3/4	- 1/4	-25.0
O	COMPUTER ENVIRON	2- 14	1 1/2	0	0.0
O	COMPUTER INDUS.	2- 10	3 1/2	0	0.0
O	COMPUTER NETWORK	3- 14	3	0	0.0
O	COMPUTER PROPERTY	5- 15	5 3/4	+ 1/2	+9.5
N	COMPUTER SCIENCES	6- 34	9 1/2	+ 1/8	+1.3
O	COMPUTER USAGE	2- 8	4 1/8	+ 1/8	+3.1
A	COMPUTING & SOFTWARE	16- 75	29 1/2	+ 3/8	+1.2
O	COMRESS	1- 10	1 1/4	- 1/4	-16.6
O	COMSHARE	2- 15	2 1/4	-1 3/8	-37.9
O	CONSOL. ANAL. CENT.	1- 3	3/4	- 1/4	-25.0
O	DATA AUTOMATION	1- 24	1 1/2	0	0.0
O	DATA PACKAGING	5- 29	5 3/4	+ 1/8	+2.2
O	DATAMATION SERVICE	1- 6	1 1/8	- 1/4	-18.1
O	DATATAB	4- 9	4	+ 1/4	+6.6
O	DIGITEK	1- 5	1 1/8	- 1/8	-10.0
O	EDP RESOURCES	5- 13	6 1/4	- 1/4	-3.8
A	ELECT COMP PROG	3- 11	3	- 5/8	-17.2
O	ELECTRONIC DATA SYS.	31-161	60	+7	+13.2
O	INFORMATICS	4- 21	6 1/4	+ 1/4	+4.1
A	ITEL	6- 26	16 7/8	+1	+6.2
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/4	0	0.0
A	MANAGEMENT DATA	8- 25	8 7/8	+ 5/8	+7.5
O	NAT COMP ANALYSTS	1- 8	2 1/8	- 1/8	-5.5
O	NAT.COMP. SERV.	2- 12	2 3/8	- 1/8	-5.0
N	PLANNING RESEARCH	13- 54	17 3/4	+ 3/4	+4.4
O	PROGRAMMING METHODS	9- 27	16 1/2	+1 1/2	+10.0
O	PROGRAMMING & SYS	2- 5	2	0	0.0
L	PROGRAMMING SCIENCES	1- 33	3/4	- 3/8	-33.3
N	SCIENTIFIC RESOURCES	2- 22	3 1/4	+ 1/8	+4.0
O	SOFTWARE SYSTEMS	1- 2	1/2	+ 1/8	+33.3
O	TBS COMPUTER CENTERS	4- 27	4 1/2	0	0.0
O	UNITED DATA CENTER	1- 4	1 1/2	0	0.0
N	UNIVERSITY COMPUTING	14- 99	20 1/2	+1	+5.1
A	URS SYSTEMS	5- 21	7	- 3/8	-5.0
O	U.S. TIME SHARING	3- 14	2 1/2	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 62	20 1/4	-2 1/8	-9.4
O	ALPHANUMERIC	2- 15	3 1/4	- 1/8	-3.7
N	AMPEX CORP	13- 48	15 3/4	+1 1/8	+7.6
O	ASTRODATA	1- 34	1	- 3/8	-27.2
O	ATLANTIC TECHNOLOGY	2- 14	5	- 1/4	-4.7
A	BOLT,BERANEK & NEW	3- 11	5 3/4	- 3/4	-11.5
N	BUNKER-RAMO	6- 14	8 3/4	+ 1/4	+2.9
A	CALCOMP	11- 34	30 3/8	+2 1/8	+7.5
O	COGNITRONICS	3- 13	4 5/8	- 1/4	-5.1
O	COLORADO INSTRUMENTS	4- 13	5 3/4	0	0.0
O	COMPUTER COMMUN.	5- 36	4 1/2	- 1/2	-10.0
A	COMPUTER EQUIPMENT	4- 12	3 7/8	0	0.0
A	COMPUTEST	12- 28	12	- 3/8	-3.0
O	CONSOL COMPUTER SVCS	4- 14	6 3/4	0	0.0
A	DATA PRODUCTS CORP	5- 26	5 7/8	- 3/8	-6.0
O	DATA TECHNOLOGY	3- 23	3	- 5/8	-17.2
O	DIGITRONICS	4- 13	3 5/8	0	0.0
N	ELECTRONIC M & M	7- 40	6 7/8	- 3/4	-9.8
O	FABRI-TEK	2- 8	2	- 1/8	-5.8
O	FARRINGTON MFG	2- 17	2 1/4	- 1/8	-5.2
O	INFORMATION DISPLAYS	4- 20	5 1/2	- 1/2	-8.3
O	MANAGEMENT ASSIST	1- 4	1	0	0.0
A	MARSHALL INDUSTRIES	14- 67	20	-2 3/8	-10.6
A	MILGO ELECTRONICS	15- 42	28 5/8	- 1/4	-0.8
N	MOHAWK DATA SCI	19- 87	25 1/2	+1 1/4	+5.1
O	OPTICAL SCANNING	11- 52	14 1/2	- 1/2	-3.3
O	PHOTON	4- 17	7 3/4	+ 1/8	+1.6
O	PHOTO-MAGNETIC SYS.	1- 9	1 3/8	0	0.0
A	POTTER INSTRUMENT	15- 42	17 7/8	+ 1/4	+1.4
O	PRECISION INST.	6- 25	8 1/2	+ 1/2	+6.2
O	RECOGNITION EQUIP	12- 83	14	+1 5/8	+13.1
O	REDCOR CORP.	4- 34	4	- 1/4	-5.8
N	SANDERS ASSOCIATES	7- 29	10 3/4	+ 3/4	+7.5
O	SCAN DATA	5- 53	4 3/4	- 3/8	-7.3
O	TALLY CORP.	10- 23	11 1/2	- 1/2	-4.1
N	TELEX	10- 25	19 1/8	- 1/2	-2.5
O	VIATRON	2- 51	2 1/2	- 1/2	-16.6
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	12	- 1/4	-2.0
O	BALTIMORE BUS FORMS	7- 21	6 1/2	0	0.0
A	BARRY WRIGHT	6- 25	7 5/8	0	0.0
A	DATA DOCUMENTS	15- 35	18 3/4	+ 3/4	+4.1
N	ENNIS BUS. FORMS	10- 19	9 1/2	- 3/8	-3.7
O	GRAHAM MAGNETICS	5- 10	8	+ 1/4	+3.2
O	GRAPHIC CONTROLS	7- 17	6 3/4	0	0.0
N	MEMOREX	46-166	70 7/8	-1 7/8	-2.5
N	3M COMPANY	71-114	90	+4 1/2	+5.2
O	MOORE BUS. FORMS	27- 38	31 1/2	- 1/2	-1.5
N	NASHUA CORP	21- 43	24 1/2	- 1/2	-2.0
O	REYNOLDS & REYNOLD	25- 48	38	- 1/4	-0.6
O	STANDARD REGISTER	17- 30	18	- 1/4	-1.3
N	UARCO	22- 39	23 3/8	- 1/8	-0.5
A	WABASH MAGNETICS	7- 30	7	0	0.0
O	WALLACE BUS FORMS	17- 41	17 1/8	+ 5/8	+3.7
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	107 7/8	+6 7/8	+6.8
N	COLLINS RADIO	9- 37	13	+1 3/8	+11.8
N	CONTROL DATA CORP	30-122	47 3/8	+3 3/8	+7.6
O	DATA GENERAL CORP	16- 59	22	-1	-4.3
A	DIGITAL EQUIPMENT	50-124	58 1/4	+3 5/8	+6.6
N	ELECTRONIC ASSOC.	3- 11	4 1/4	+ 1/8	+3.0
A	ELECTRONIC ENGINEER.	3- 14	4	- 1/8	-3.0
N	FOXBORO	18- 39	20 1/4	+1 1/4	+6.5
O	GENERAL AUTOMATION	9- 42	13	+1	+8.3
N	GENERAL ELECTRIC	60- 88	87 3/8	+1 5/8	+1.8
N	HEWLETT-PACKARD CO	19- 45	25 1/4	- 1/8	-0.4
N	HONEYWELL INC	65-152	72 3/4	+ 3/4	+1.0
N	IBM	223-387	299	+8	+2.7
N	NCR	30- 86	34 5/8	+2 7/8	+9.0
N	RCA	18- 34	23 3/8	+1 3/8	+6.2
N	RAYTHEON CO	16- 33	20 5/8	+ 1/2	+2.4
O	SCI. CONTROL CORP.	1- 8	1 1/2	0	0.0
N	SPERRY RAND	19- 40	22 1/4	+ 3/8	+1.7
A	SYSTEMS ENG. LABS	10- 49	15	+1	+7.1
N	VARIAN ASSOCIATES	9- 29	11	- 3/8	-3.2
A	WANG LABS.	18- 51	29 1/8	+ 1/2	+1.7
N	XEROX CORP	66-115	86 5/8	+3 1/8	+3.7
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	11 3/4	0	0.0
O	BRESNAHAN COMP.	2- 9	2 3/8	+ 3/8	+18.7
O	COMPUTER EXCHANGE	2- 8	3 7/8	- 1/2	-11.4
A	COMPUTER INVSTRS GRP	4- 12	8 1/4	+1 1/4	+17.8
N	DATA PROC. F & G	6- 32	10 3/8	+ 1/2	+5.0
O	DATRONIC RENTAL	2- 8	2 5/8	- 1/8	-4.5
A	DEARBORN COMPUTER	10- 24	20 3/8	+1	+5.1
O	DIEBOLD COMP. LEAS.	2- 8	3 5/8	- 1/8	-3.3
A	DPA, INC.	3- 10	4 1/8	+ 1/4	+6.4
A	GRANITE MGT	7- 22	9 1/8	- 1/8	-1.3
A	GREYHOUND COMPUTER	5- 44	6 1/2	- 1/4	-3.7
N	LEASCO DATA PROC.	7- 30	10 3/8	+ 3/8	+3.7
O	LECTRO COMP LEAS	2- 9	2	- 1/8	-5.8
A	LEVIN-TOWNSEND CMP	3- 19	4 7/8	- 1/8	-2.5
O	LMC DATA, INC.	1- 3	5/8	- 1/8	-16.6
O	NCC INDUSTRIES	3- 8	3 1/2	+ 1/8	+3.7
O	SYSTEMS CAPITAL	1- 8	2 1/2	+ 1/4	+11.1
N	U.S. LEASING	3- 19	12 1/2	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

AMERICAN COMPUTER LEASING
Three Months Ended Sept. 30

	1970	1969
aShr Ernd	$.19	$.17
Revenue	2,063,482	1,855,568
Earnings	391,212	347,916
Tax Cred	128,814	104,796
bEarnings	520,026	452,712
a9 Mo Shr	.56	.52
Revenue	6,108,437	5,226,654
Tax Cred	372,463	307,867
bEarnings	1,510,470	1,361,315

a-Based on income before tax credits. b-Equal to 25 cents a share in the nine months, compared with 22 cents a share and 67 cents a share, respectively, in the like periods of 1969.

Assuming full conversion net income per share for the nine months would be equal to 63 cents in 1970 and 58 cents in 1969.

CONSOLIDATED COMPUTER LTD.
Six Months Ended June 30

	1970	1969
Revenue	$199,182	$63,262
Loss	1,991,268	352,145

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Buy/Sell/Lease

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085	087	088	402	403
407	514	519	552	602

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An effective source program retrieval and maintenance system.

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An Update Record lists all operations performed in the current run. A Summary of Activity lets you know how modules are affected and cites any errors found. A permanent record of all activities for any source program is stored on master tapes for easy retrieval.

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NEW FEATURE: COBOL SYNTAX CHECKER. A syntax checker has recently been added to the Librarian to enable a user to rapidly check the syntax of a COBOL source program as it is being updated. The checker will increase programmer efficiency and accuracy, as well as save COBOL compiling time.

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